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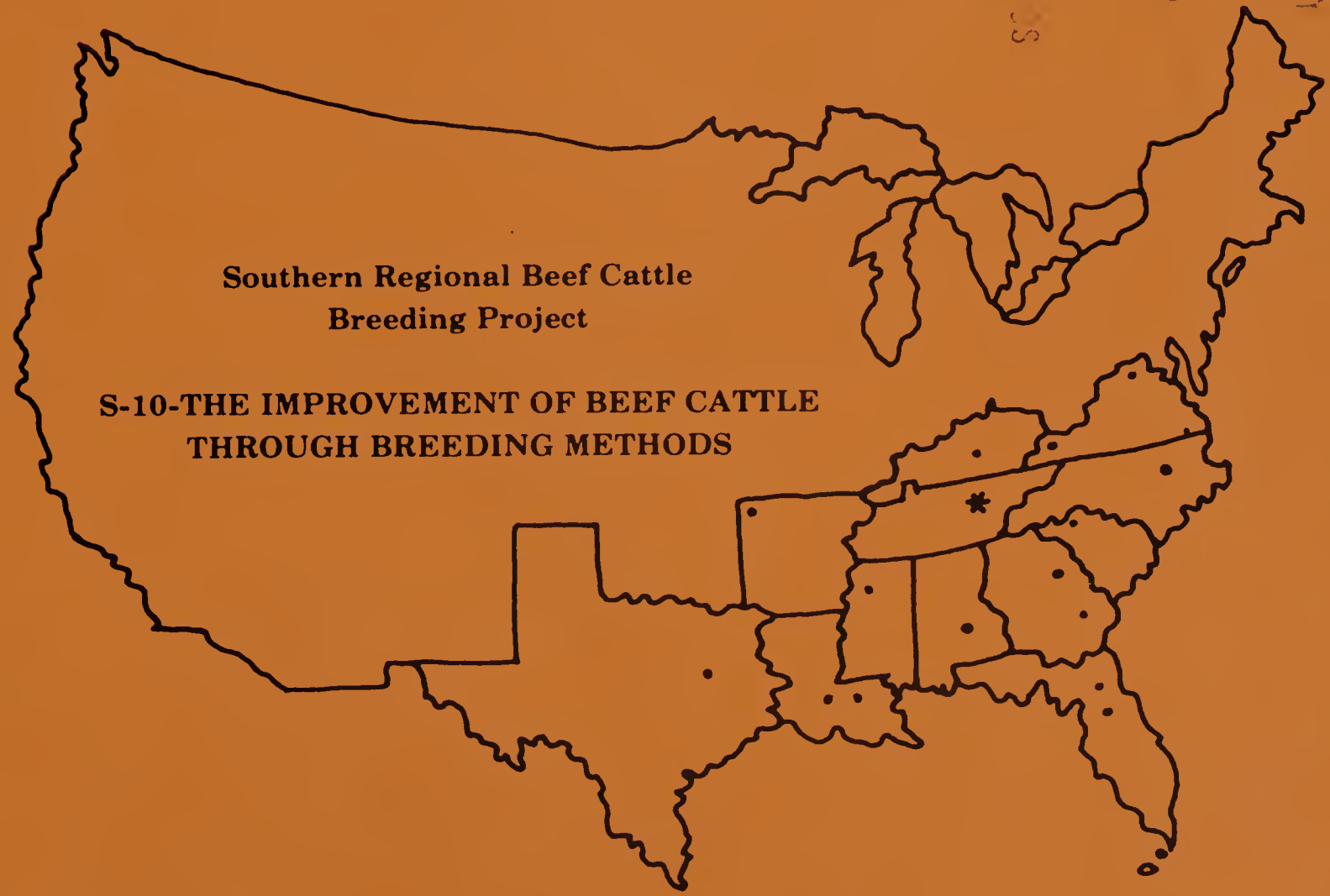
UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH  
SOUTHERN REGION  
and  
COOPERATING SOUTHERN STATES

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**1978 Annual Report of S-10  
and  
Report of  
Annual Technical Committee Meeting  
University of Tennessee  
Knoxville, Tennessee  
August 2-4, 1978**

1978-1979

JUN 12 1978



This report is intended for the use of administrative leaders and workers  
and is not for general publication.





S-10 1978 ANNUAL REPORT



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## I N T R O D U C T I O N

This project was initiated in 1948 to investigate and develop methods of breeding more productive beef cattle for the South. Detailed annual reports showing research developments and progress in each state have been prepared each year since 1950. Complete results of certain phases of the project have been reported in regional bulletins and technical articles to the S-10 project.

This publication includes the proceedings of the 1978 annual meeting of the S-10 Technical Committee and the annual reports of projects in each of the eleven contributing states. The annual reports of S-10 contributing and supporting projects were prepared by the project leaders and other personnel at the various stations during 1978. The results are not considered final, but the materials aid cooperators in developing an integrated program. This report also provides information needed by heads of animal science departments, experiment station directors and U.S. Department of Agriculture officials for evaluation of the projects with respect to objectives and procedures. This report is not for general distribution and material contained in it should not be quoted in publications.

## MINUTES OF THE S-10 EXECUTIVE COMMITTEE MEETING

Houston, Texas  
February 5, 1978

The S-10 Executive Committee Meeting was called to order in the Houston-Marriott at 7:08 P.M., February 5, 1978 by Chairman Donald E. Franke. Technical Committee members present included J. R. Crockett, R. R. Shrode, T. J. Marlowe, C. R. Long, T. B. Patterson, C. J. Brown, W. T. Butts, Jr. and C. E. Thompson.

Chairman Franke asked for discussion on the minutes of the June meeting. Dr. Patterson moved the minutes as previously corrected by accepted, Dr. Brown seconded the motion and it passed. Regional publications were then discussed. Dr. Brown reported on the progress made with straightbred data and that each technical committeeman be responsible for limiting the data to 5 years (if not previously done so). Dr. Crockett recommended that the adjusted weaning weight data be used from each station. The group concurred. Dr. Marlowe suggested that Dr. Brown send each technical committeeman a one page write up with an example of the type of material being requested for the publication and that the information be returned to him shortly after receiving the request. Chairman Franke reported that the crossbred publication had been delayed due to a temporary shifting of work loads at L.S.U., but hoped to have a preliminary analysis prior to the summer S-10 meeting.

Dr. Butts then discussed information regarding the Virgin Islands project. Dr. Patterson moved the project be accepted with written suggestions for improvement of the project being sent to Dr. Harold Hupp and to Dr. Butts. The motion was simultaneously seconded by Drs. Long and Crockett and passed.

Dr. Butts also discussed the possibility of a post Doctoral posi-

tion at the University of Tennessee to work with him and requested names of suitable individuals which he anticipated would be involved with the S-10 group on data collected at Front Royal, Brooksville or other data in cooperation with the contributing stations.

Dr. Shrode reported that the preference for the joint meeting this summer was equally divided between the alternatives and that the date of the meeting would be determined by the availability of the speakers.

Dr. Crockett moved for adjournment, seconded by Dr. Long, meeting was adjourned.

Respectively submitted,

C. E. Thompson  
Secretary, S-10







## JOINT MEETING OF USSES AND S-10

Sheraton Inn West

Knoxville, Tennessee

August 2-4, 1978

AGENDA

<u>Day</u>	<u>Time</u>
Tues., 8/1	8:00 - Combined registration and social
Wed., 8/2	8:29 - Introductions, welcome and announcements Dr. D.M. Gossett, Dean, Agric. Exp. Sta., Univ. of TN Dr. T.J. Whatley, Adm. Advisor, USSES Dr. Doyle Chambers, Adm. Advisor, S-10
	9:00 - Mixed models: A review of variance component estimation S.E. Searle, Cornell University (Coffee break 10:00-10:20)
	12:00 - Lunch
	1:00 - Mixed models: A review of best linear unbiased prediction (BLUP) and algorithm computations R.L. Quaas, Cornell University (Coffee break 3:00-3:20)
	4:30 - Adjourn
	6:00 - Cook out
Thurs., 8/3	8:00 - Mixed models: Computing capabilities of least squares maximum likelihood general purpose program (LSMLGP) and Harvey's mixed model program W.R. Harvey, Ohio State University (Coffee break 10:00-10:20)
	12:00 - Lunch
	1:00 - Mixed models: Computing capabilities of statistical analysis system (SAS) J.H. Goodnight, SAS Institute (Coffee break 10:00-10:20)
	3:20-4:30 - General discussion
Fri., 8/4	8:00 - 12:00 Separate sessions of USSES and S-10

## RESOLUTION

U.S.S.E.S.

The U.S.S.E.S. work group meeting in Knoxville, Tennessee, August 2-4, 1978 jointly with S-10 hereby resolves:

1. That we express to the members of S-10 our appreciation for the opportunity of meeting for an excellent program of mutual interest.
2. That we believe that this type of meeting will mutually enrich our future association with statistical problems involving animal breeding and other phases of animal research.
3. That this joint meeting will stimulate both groups (S-10 and U.S.S.E.S.) to pursue joint meeting with groups of other discipline.
4. That we express to Bob Shrode our great appreciation for his part in organizing this fine meeting.

# MINUTES OF S-10 TECHNICAL COMMITTEE MEETING

August 4, 1978  
 Sheraton Inn West  
 Knoxville, Tennessee

The Annual Meeting of the S-10 Technical Committee was called to order by Chairman Donald E. Franke at 8:07 a.m. on August 4, 1978, at the Sheraton Inn West, Knoxville, Tennessee, following two days of meeting jointly with USSES. The following Technical Committee members were present:

Alabama - Troy B. Patterson, Auburn University, Auburn, Alabama

Arkansas - C. J. Brown, University of Arkansas, Fayetteville, Arkansas

Florida - J. R. Crockett, A.R.E.C., Belle Glade, Florida

Georgia - W. E. Neville, Jr. (Proxy for W.C. McCormick), Georgia Coastal Plain Experiment Station, Tifton, Georgia

Kentucky - F. A. Thrift, University of Kentucky, Lexington, Kentucky

Louisiana - D.E. Franke, Louisiana State University, Baton Rouge, Louisiana

North Carolina - Emmett U. Dillard, N. C. State, Raleigh, North Carolina

South Carolina - C. E. Thompson, Clemson University, Clemson, South Carolina

Tennessee - R. R. Shrode, University of Tennessee, Knoxville, Tennessee

Texas - C. R. Long, Texas A&M University, College Station, Texas

Virginia - T. J. Marlowe, Animal Science Department, VPI, Blacksburg, Virginia

Virgin Islands - Harold Hupp, USVI, St. Croix, USVI

Research Leader - Will T. Butts, Jr., USDA, Knoxville, Tennessee

CSRS Representative - Estel H. Cobb, USDA, SEA, CR, Washington, D. C.

Louisiana - Doyle Chambers, Louisiana State University, Baton Rouge, Louisiana

Also in attendance were:

K. P. Bovard, Animal Science Department, VPI, Blacksburg, Virginia

W. C. Burns, Brooksville, Florida

Jim Gaines, VPI, Blacksburg, Virginia

David Harman, University of Florida, Gainesville, Florida

Dewey L. Harris, USDA-SEA-FR, Purdue University, West Lafayette, Indiana

Brad Knapp, USMARC, Clay Center, Nebraska

Earl L. Lasley, Des Moines, Iowa

Roger L. McCraw, Animal Science Department, N.C. State University,  
Raleigh, N.C.

Joe Neely, Animal Science Department, N.C. State University, Raleigh,  
N.C.

David Notter, Animal Science Department, VPI, Blacksburg, Virginia

Tim Olson, Animal Science Department, Gainesville, Florida

F. M. Peacock, ARA, Ona, Florida

O. W. Robison, Animal Science Department, N. C. State University,  
Raleigh, N. C.

David Shannon, Animal Science Department, University of Tennessee,  
Knoxville, Tennessee

Bill Whittle, Animal Science Department, VPI, Blacksburg, Virginia

Wayne Wyatt, Animal Science Department, VPI, Blacksburg, Virginia

Chairman Franke asked each participant to vocally introduce himself to the group in order to acquaint everyone with those present. Chairman Franke asked for any additions or corrections on the minutes of the Executive Committee meeting held February 5, 1978, in Houston, Texas. Dr. Long moved the minutes be accepted as circulated, simultaneously seconded by Dr. Dillard. Motion passed.

The meeting was continued with the following station reports:

North Carolina - Emmett U. Dillard

South Carolina - C. E. Thompson

Tennessee - R. R. Shrode

Texas - C. R. Long

Virginia - T. J. Marlowe  
J. A. Gaines  
K. P. Bovard

Virgin Islands - Harold Hupp

Dr. Thrift reported on a cooperative study of data provided on selected and genetic control lines from the University of Kentucky, N.C. State University and the University of Tennessee.



Also reporting on cooperative efforts at Brooksville, Florida, with the Virgin Islands contributing project was W. C. Burns.

The S-10 group was also privileged to entertain the reading of resolutions by Dr. Richard Patterson of Auburn University representing USSES in regard to the outstanding cooperation, exchange of knowledge and mutual benefit and understanding resulting from the joint meeting.

### Old Business

Dr. C. J. Brown handed out material assembled for the regional publication on straightbred Angus cattle and pointed out apparent differences in maturity, variability in years and station effects. Discussion ensued as to what further analyses should be done and after further input from the committee, Dr. Brown was encouraged to pursue his efforts for a regional publication.

Chairman Franke raised the question as to pursuing the same type of publication on Hereford (or Polled Hereford) cattle. After very brief discussion, Dr. Will Butts informed the group that such a publication was the original intention of the committee.

Chairman Franke then reported the progress made by the committee on regional publication of data on crossbreeding. Due to limited data available, particularly with regard to the lack of straightbreds for contemporary comparison and other problems, progress has been slow. However, as the NC-1 group is also involved in a similar venture, Chairman Franke is to work on a way to analyze and publish the data receiving suggestions from Larry Cundiff of NC-1. Drs. Long and Marlowe raised questions as to the proper form of the data submitted. After some discussion and clarification of what the committee needed, it was decided that Chairman Franke will be contacting technical committeemen regarding their crossbreeding

data in the near future.

### New Business

An invitation was extended to the S-10 group by Dr. Thrift to meet at the University of Kentucky next year. Dr. Long moved acceptance of the invitation and the motion was seconded by Dr. Dillard. Motion passed. Dr. Thrift indicated the meeting would probably be in early June. Dr. Thrift suggested the possibility of meeting close to the time the sheep breeders are meeting.

Election for an Executive Committeeman was held by secret ballot and Dr. Harold Hupp was elected. Serving with him for the 1978-79 year will be Dr. J. R. Crockett, Secretary and Dr. C. E. Thompson, Chairman.

Chairman Franke called on the Resolution Committee consisting of Dr. Thrift, Long and Brown for their report. Dr. Thrift read the report of the committee. Dr. Marlowe moved the report be adopted and Dr. Brown seconded the motion. The motion carried. After discussion of the benefits derived from meeting with the USSES group, Dr. Marlowe moved further comments be added to the resolutions expressing our appreciation to Dr. Bill Sanders and the USSES group. Dr. Long seconded the motion and it was passed.

Dr. Estel Cobb, USDA-SEA representative, was asked to address the group. He requested that in preparing the annual report all data should be presented in the metric system and by objectives. He asked that copies of the minutes be mailed to his office immediately following the meetings. He emphasized the concern over the problems in funding that were pointed out by Dr. Doyle Chambers in his address to the joint meeting earlier in the week.

Dr. Will Butts, Research Leader, addressed the groups concerning the

completion of the "shipping fever" work and his plans concerning the S-10 project this coming year including work on regional analyses. He also mentioned that Dr. Robert McCurley would be working with him on a post-doctoral appointment. He also discussed two different groups that have been formed: a Forage-Livestock Committee and a Genotype-Environmental Interaction Committee and expressed concern involved in the overlap of these groups with research being conducted currently by regional groups - specifically by S-10. Discussion followed with remarks by Drs. Long, Burns, Franke and Harris.

Dr. Crockett moved for adjournment. This motion was seconded by Dr. Dillard. Meeting adjourned at 12:35 p.m.





ANNUAL REPORT OF COOPERATIVE REGIONAL PROJECT  
January 1 to December 31, 1978

1. PROJECT: Breeding Methods for Beef Cattle in the Southern Region. S-10.
2. COOPERATIVE AGENCIES AND PRINCIPAL LEADERS:

Cooperating State Experiment Stations and Technical Committee:

Alabama	T. B. Patterson
Arkansas	C. J. Brown
Florida	J. R. Crockett
Georgia	W. C. McCormick
Kentucky	Fred Thrift
Louisiana	D. E. Franke
North Carolina	E. U. Dillard
South Carolina	C. E. Thompson
Tennessee	R. R. Shrode
Texas	C. R. Long
Virginia	T. J. Marlowe
Virgin Islands	Harold Hupp

U. S. Department of Agriculture Agencies and Leaders:

W. T. Butts, Research Leader, S-10, ARS, Knoxville, Tennessee  
W. C. Burns, Location Leader, Brooksville Beef Cattle Research  
Station, Brooksville, Florida  
E. H. Cobb, Cooperative State Research Service, Washington, D.C.

Regional Officers, 1977-78:

Doyle Chambers, Administrative Advisor, Baton Rouge, Louisiana  
D. E. Franke, Chairman, Baton Rouge, Louisiana  
C. E. Thompson, Secretary, Clemson, South Carolina  
J. R. Crockett, Executive Committee Member, Belle Glade, Florida

3. PROGRESS OF THE WORK AND PRINCIPAL ACCOMPLISHMENTS:

One experiment station bulletin, 11 journal articles, 7 abstracts and 47 miscellaneous publications were reported from work associated with the regional project.

Results were available from two regional studies. To characterize growth profiles of Angus cattle in the Southern region and to investigate a procedure of herd evaluation, static type weight data from 11 experiment station herds (5 Years) contributing to S-10 were summarized. Examination of a series of weight-age curves from each location indicated lifetime development patterns at each location. Indicated range of mature weights was from 418 to 501 kg and of coefficients indicating rate of maturing from .0667 to .0529. Gross correlations were low and positive between mature weight and percent pregnant, calf survival, preweaning gain and type score. Correlations between maturing rate and these traits were not consistent in sign. Preweaning records on 2864 calves from the Kentucky, North Carolina and Tennessee Stations were utilized to estimate heritabilities of birth weight and weaning weight. Each station maintained a select line (weight gain) as well as a genetic control line, and heritability values were calculated separately for each sex and line of calf combination by combining data from the three station. Heritability values

for birth weight were  $.188 \pm .093$  and  $.335 \pm .178$  for bull calves from the select and control lines, respectively. Corresponding values for heifer calves were  $.392 \pm .122$  and  $.434 \pm .203$ , respectively. Values for weaning weight were  $.274 \pm .114$  and  $.388 \pm .206$  for bull calves from the select and control lines, respectively. Corresponding values for heifer calves were  $.156 \pm .109$  and  $.392 \pm .222$ , respectively. Within sex of calf, heritability values could not be declared different ( $P > .05$ ) for the two lines for either trait. However, these data reflect only one complete generation of selection.

Preliminary data (Ala.) from a study of relationships between components of production efficiency and rate of maturing found only slight differences ( $P > .05$ ) in adjusted weaning weights from herds assembled on the basis of being slow or fast maturing. Study of genetic change in an Angus herd (Ark.) between 1952 and 1976 reported a significant increase in yearling weight but no change in birth weight. Tennessee found carcass weight at a constant fat level and time on feed to reach that degree of fattness, but not rate of gain, to be related to structural dimension and condition at weaning and breed effects. Physical description of the calves was more effective than breed in predicting carcass weight and similar to breed in predicting required time on feed. Feed efficiency, yield grade and carcass quality grade was similar for all types of cattle included in the study. Tall, thin calves produced heavier carcasses due to growing over a longer period of time rather than by growing faster. Hence, selection for single traits appears to result in changes in the pattern of response of many traits. Largely theoretical work (Tex.) included in previous reports has indicated that production efficiency is more related to such patterns of response than to excellence in individual traits.

Initial data were obtained (V.I.) for characterization of the Senepol breed. Mean values reported are: birth weight for both sexes, 29.5 kg; adjusted 205-day weight, 215 kg; weight of bulls (2-12+ years), 665 kg; length of bulls, 89.2 cm; height at hip of bulls, 137.2 cm; length from hooks to pins, 48.3 cm; mature cow (2-12+ years) weight, 488 kg; length, 81.8 cm; height, 131.8 cm; and length hooks to pins, 46.0 cm.

Comparison of straightbred, two- and three-breed rotational crosses (La.) among Angus, Hereford, Brahman and Charolais found three-breed crosses to be heavier at weaning than two-breed crosses but noted that sire breed effects may have contributed to the difference. Crossbred calves tended to be fatter at weaning than straightbreds. Charolais calves were similar to crossbreds in conformation score. Heterosis was observed (Tex.) for weight (7-14%) and height (2-4%) in bulls and heifers. Angus, Brahman, Hereford, Holstein and Jersey breeds were involved. Management (pasture vs individual feeding) affected level of heterosis observed in heifers. Results suggested that heterosis in younger animals may be partially due to potential for accelerated development in crossbreds. Preliminary analyses of records of cows producing first and second inter se calves revealed average heterosis estimates for age at first parturition (-5.4%), postpartum interval (-4.6%), calving interval (-.5%), calves born alive (9.0%), calves weaned of calves born (11.3%), parturition weight (5.8%) and parturition height (2.4%). Field data from Hereford x Angus crosses (Ky.) provided heterosis estimates for birth weight (0), weaning weight (4.8%) and weaning type score (1.8%) which agreed reasonably well with results from controlled experiments.



In a continuing study of the double muscle condition (Tex.), two sets of twins were born in 1978. The first set (born 4-8-78) consisted of a homozygous doubled muscle male and a homozygous normal muscled female. A normal embryo (Hereford x Angus) was transferred to a homozygous doubled muscle cow which had been bred to a homozygous doubled muscle bull. Thus the doubled muscle cow was the biological mother of the doubled muscle calf and the foster mother of the normal calf, both calves having shared the uterus of the same cow at the same time during prenatal development. At the present time, the genetically doubled muscle calf shows typical phenotypic features of doubled muscling. The genotypically normal calf, however, shows many phenotypic features consistent with that of a genotypic doubled muscle heterozygote. The most prominent of these features are thick muscling and the tendency for a "stretched" stance when standing at rest. In the near future muscle biopsies will be taken to determine muscle fiber types and the number of axons innervating the muscles.

The second set of twins was born 12-20-78 and consisted of a female (homozygous doubled muscled) and a male (homozygous normal muscled). Although both calves were lightly muscled at birth, the homozygous doubled muscled calf had unmistakable characteristics of double muscling: thick tongue which protruded outside the mouth, short tail with high setting and sloping rump. The homozygous normal calf was not remarkable at birth. The double muscled calf died from exposure on 1-2-79. Muscle biopsies were taken to determine fiber types and the number of axons innervating the muscles.

#### 4. USEFULNESS OF FINDINGS:

Most management decisions in the beef production process require recognition of both genotypic differences and the effects of previous environment on the phenotypic expression of such differences in order that subsequent responses of the animals may be estimated. Work conducted within the S-10 project has defined a large number of genotypic responses to varied production situation and related them to overall production efficiency. The body of knowledge to which the above has contributed provides the basis for decisions which allow cattlemen to continuously adapt to changing conditions.

#### 5. WORK PLANNED FOR NEXT YEAR:

Investigations will proceed according to project outline, revised August, 1975. Work will be initiated to characterize the Hereford breed in the South similar to the characterization of the Angus breed nearing completion.

#### 6. PUBLICATIONS ISSUED OR MANUSCRIPTS APPROVED DURING THE YEAR:

See attached list.

#### 7. APPROVED:

March 5, 1979  
(Date)

Carl E. Thompson  
Chairman, Technical Committee

Mar 9, 1979  
(Date)

Douglas Chambers  
Regional Administrative Advisor



S T A T E   R E P O R T S





AUBURN UNIVERSITY  
Agricultural Experiment Station  
Auburn, Alabama

I. PROJECT: Hatch 428 (S-10)  
Parameters Associated with Growth Rate Curves in Beef Cattle

II. OBJECTIVES:

To evaluate changes in growth curves in beef cattle while selecting for growth rate at early and late stages of maturity.

To relate production efficiency to variation associated with differences in rate of maturing.

To determine the relationship between the rate of utilization of metabolic hormones and rate of growth.

III. PERSONNEL:

T. B. Patterson and D. N. Marple

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work.

The relationship among the variables growth rate, economics of production and mature size in beef cattle are known. However, most of the selection for growth rate was done without regard to the effect on mature size. Information is needed therefore, to determine if growth rate can be increased during the early stages of growth, i.e. from birth to 450 days of age, without a significant increase in mature weight.

Data on feed required for maintenance and growth associated with these differences in growth rate and maturity patterns are needed. Also, the relationship between growth rate patterns and composition of gain is essential if successful breeding programs are to be formulated.

The recent increased emphasis on metabolic efficiency or the ability of animals to convert forages and concentrates into muscle protein has stimulated research on the regulation of muscle growth and nutrient conservation. The expression of genetic potential for growth, specifically muscle growth, is regulated by metabolic hormones. If the mechanisms or interactions of these hormones can be defined, researchers and livestock producers would be provided with an additional tool to identify and select animals of superior growth potential and efficiency at an early period of the animal's growth curve.

Approximately 100 each of purebred Angus, Charolais and Hereford cows will be divided into two groups on the basis of early and late rate of maturing. Individual weight records as well as body type, indicative of rate of maturing in cattle, will be used in making the herd division. These cows will be bred to purebred bulls within breed groups selected on the same basis as was used to divide the cows. The source of bulls will be from herds with sufficient records to estimate selection differential and to make sure that bulls with correct geno-

type for rate of maturity are secured. In addition, sources of bulls will be sampled so that inbreeding is held to a low level.

Selection of replacement females will be on a within breed-group basis. Selection in the early maturing herds will be by index for early growth rate from birth to one year as a ratio of growth rate from birth to 18 months of age. Selection in the late maturing herd will be for rapid growth from birth to 18 months of age.

Weights will be recorded on all calves at birth and at 28-day intervals until herd replacements, both male and female, are selected. Thereafter, weights will be recorded on each female at calving and at weaning. Weights will be recorded on each bull at the beginning of the breeding season.

All females will be exposed for breeding so as to calve first as two year olds. Cow will be recorded as open or calving, absence of or level of dystocia and weaned or failed to wean a calf.

All cows and calves will be subjected to the same general environmental conditions. Cow groups will be rotated on spring, summer and fall pastures to minimize differences. Winter feeding will consist of a full feed of corn silage with protein supplement added as needed. The calves will receive creep when supplemental feed is indicated to insure maximum growth. Creep feeding will be started in all groups at the same time and once started it will be continued until weaning.

During the post-weaning period all calves will be full fed corn silage within groups on a breed-sex-rate of maturing basis. The heifers will receive supplement in the form of protein and energy at a level to produce average gain of approximately 1.5 pounds per day. The bull calves will receive the same supplements but at a level sufficient to insure maximum expression of genetic ability to gain.

Samples of three or more animals will be selected from each breed-sex-rate of maturing group shortly after birth. All animals will be weaned at 3 months of age, individually fed and daily consumption recorded.

Biopsies will be taken at 3-month intervals from the longissimus dorsi or semimembranosus muscles and prepared according to the procedure of Hagarty and Naude (7) to determine muscle fiber diameter. Mean muscle fiber diameter will be plotted against age and will be used to monitor muscle growth rate. Body composition will be estimated at each biopsy using predictive equations based on ultrasonically determined fat thickness over the loin at the 12th rib and body weight.

The metabolic clearance and/or biological half-life of growth hormone, testosterone, thyroxine and triiodothyronine will be determined in cattle at 3,6,9,12,15,18 and 21 months of age. The determination will be made first using bulls and secondly using steers with experiments replicated over years.



## 2. Research results.

The first set of calves from purebred Angus and Hereford cows that had been previously divided into fast and slow rate of maturing groups were dropped during the 1977-78 calving season. These calves have been weaned and are currently on post-weaning performance test. There were only small nonsignificant differences in adjusted weaning weights in favor of the slow maturing groups.

Matings are being made for a second calf crop in the Angus and Hereford herds and for the first calf crop in the Charolais herds.

## V. FUTURE PLANS:

The project will continue as outlined.

## VI. PUBLICATIONS DURING THE YEAR:

None

## VII. PUBLICATIONS PLANNED:

None

I. PROJECT: Animal Science 4-017

The Effects of Breed and Breed Crosses on Milk Production and on Other Production Factors in a Grade Beef Herd.

II. OBJECTIVES:

To determine the effect of Brown Swiss, Holstein and Charolais breeding on (a) milk production, (b) weaning weights and grades, (c) feedlot performance and (d) carcass desirability.

III. PERSONNEL:

T. B. Patterson and R. A. Moore

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work.

Many of the commercial beef herds in the Southeast were established with common cows of predominately dairy breeding as foundation females. Purebred beef bulls were used in a grading up process. Most of the build up in numbers and subsequent grading up process occurred within the past 15-20 years when market price and demand favored a so called "milk fat calf". Consumer preference has changed over the past five to ten years to a demand for heavier beef. Nevertheless, most commercial producers in Alabama still market their calves at weaning, and total weight and price per cwt. determine gross receipts.

In the opinion of many commercial breeders there is an apparent reduction of milking abilities of brood cows associated with the grading up process. Milk is the most important source of quality nutrients in the diet of the beef calf. Producers are faced with the choice of reverting to the original type cows that are often lacking in beef conformation and/or inherent ability to gain, or attempting to improve milk production within the existing herd through phenotypic selection. Obviously, improvement in milk production can be accomplished most rapidly through the use of selected sires since a sire constitutes roughly one-half of the genetic make-up of the herd.

Seventy-five grade beef cows were divided into similar groups of 25 each on the basis of age, breeding and previous production record each year. They were bred to Hereford (control), Brown Swiss and Charolais bulls. The bulls were changed each year. A group of Holstein and Holstein-Jersey cows were bred to the Hereford bulls.

Additional information such as milk production of the original cows at 90 and 250 days of lactation was established. Production information on all calves to weaning can be related to milk production of their dams. Post weaning performance and carcass data on all steer calves provided information on the effects of breeding on production.

All physically sound heifers produced by the procedure described above have been retained until approximately 25 breeding age females per breeding group were available. These heifers were bred to closely related Hereford bulls selected from a high producing herd. Only bulls with above average weaned weights were considered. Milk production obtained from this set of females will provide a comparison with the original and with subsequent herd milk production levels. Milk production and breed of dam is confounded; however, differences in calf weaned weights reflects these two important brood cow characteristics.

All steer calves are full fed on corn silage plus supplement until they have reached 1,000 lbs. and average in the Choice grade. Carcass data are obtained on all steers. As before, all physically sound heifers are retained as replacements for the next generation.

## 2. Research results.

Four calf crops have been weaned from the third and final generation of cows. Three groups of steers were finished in the feedlot, slaughtered and carcass data obtained. These data are summarized in tables 1, 2 and 3.

All cows are either straight bred Herefords (the controls) or 7/8 Hereford backcrosses, thus, it was not expected that the backcrosses would perform differently from the controls. The straight Hereford, the 1/8 Charolais and the 1/8 Brown Swiss groups produced more pounds of calf per cow bred than the 1/8 Holstein group. However, these differences were small.

There were no differences among the breeding groups for feedlot performance or for any carcass characteristic measured.

## V. FUTURE PLANS:

The project will continue as outlined.

## VI. PUBLICATIONS DURING THE YEAR:

None

## VII. PUBLICATIONS PLANNED:

Experiment Station Bulletin

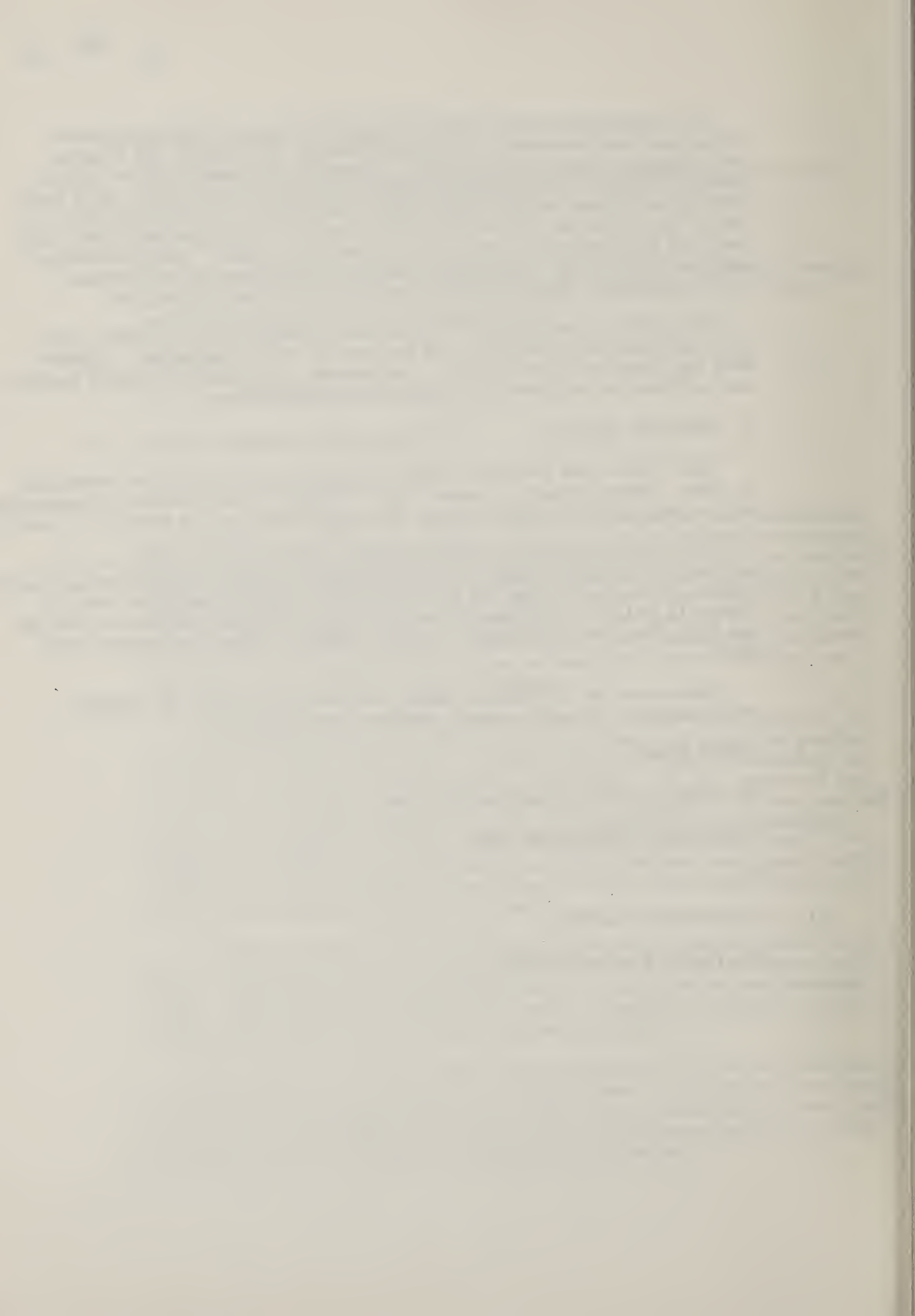




Table 1. Pre-weaning performance traits for third generation cows and their calves. Four year average.

	Breeding of cows <sup>1</sup>			
	Hereford	7/8 Hereford	7/8 Hereford	7/8 Hereford
		1/8 Charolais	1/8 Brown Swiss	1/8 Holstein
No. of cows bred	70	81	87	80
No. of calves born	58	68 <sup>3</sup>	75 <sup>3</sup>	67
No. of calves weaned	54	63	70	56
Percentages weaned	77.1	77.8	80.4	70.0
Avg. adj. weaning wt., Kg.	204.5	218.4	211.5	207.0
Avg. Kg. calf/cow bred	157.7	169.9	170.0	144.9
Avg. stocker grade <sup>2</sup>	13.1	13.4	13.3	13.3

- 1/ All cows bred to Hereford bulls.  
2/ 12 = low Choice; 13 = Choice; 14 = high Choice, etc.  
3/ Includes one set of twins.

Table 2. Feed lot performance for steers from third generation cows. Three year average.

	Breed of steers			
	Hereford	15/16 Hereford	15/16 Hereford	15/16 Hereford
		1/16 Charolais	1/16 Brown Swiss	1/16 Holstein
No. of steers	18	17	28	14
Avg. initial wt., Kg.	229.3	246.6	230.2	241.8
Avg. final wt., Kg.	398.2	430.8	406.5	425.0
Avg. daily gain, Kg. <sup>1</sup>	.72	.79	.77	.78
Avg. slaughter grade <sup>1</sup>	12.0	12.0	12.1	12.3

1/ 12 = low Choice; 13 = Choice, etc.

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Alabama

Location	Winfield	Winfield	Winfield	Winfield	
Breed of sire	Hereford	Hereford	Hereford	Hereford	
Breed of dam	Hereford	7/8 Hereford 1/8 Charolais	7/8 Hereford 1/8 Brown	7/8 Hereford 1/8 Holstein	
Line or group <sup>1</sup>	Control	Backcross	Swiss Backcross	Backcross	
Percent used in project	100	100	100	100	
Inventory as of December 31, 1978	Cows 2 years and over	18	18	20	15
	Yearling heifers	3	10	3	4
	Bulls and steers under 1 year	8	10	12	4
	Heifers under 1 year	8	8	7	11
	Bulls over 1 year	2	0	0	0
	Steers over 1 year	0	0	0	0
Repro. perf.	Percent pregnant <sup>2</sup>	85.0	95.4	90.9	83.3
	Calf survival percent <sup>3</sup>	94.1	95.2	95.0	100.0
Wean. perf.	Adj. ADG <sup>4</sup> Kg.	.65	.68	.68	.66
	Ave. type sc. <sup>5</sup>	12.9	13.3	13.2	13.5
Postweaning performance	No. of bulls	0	0	0	0
	No. of heifers	0	0	0	0
	No. of steers	9	7	13	6
Slaughtered	No. of bulls	0	0	0	0
	No. of heifers	0	0	0	0
	No. of steers	9	7	13	6

## Remarks

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments: Age, mature dam and steer equivalent.<sup>5</sup>Suggest S-10 scoring system: indicate if different.  
S-10-1 (Rev.)



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Alabama

Location		Milstead	Milstead	Milstead	Milstead	
Breed of sire		Angus	Angus	Hereford	Hereford	
Breed of dam		Angus	Angus	Hereford	Hereford	
Line or group <sup>1</sup>		Slow maturing	Fast Maturing	Slow Maturing	Fast Maturing	
Percent used in project		100	100	100	100	
Inventory as of December 31, 1978	Cows 2 years and over	64	56	43	46	
	Yearling heifers	11	10	10	10	
	Bulls and steers under 1 year	32	29	15	15	
	Heifers under 1 year	21	17	17	20	
	Bulls over 1 year	2	2	2	2	
	Steers over 1 year	0	0	0	0	
Repro. perf.	Percent <sup>2</sup> pregnant	86.2	91.7	90.2	90.0	
	Calf survival percent <sup>3</sup>	94.6	88.4	82.5	78.3	
Wean. perf.	Adj. ADG <sup>4</sup> Kg.	.74	.72	.60	.58	
	Ave. type sc. <sup>5</sup>	13.8	13.1	13.5	13.4	
Postweaning performance	No. of bulls	37	33	13	15	
	No. of heifers	28	30	19	19	
	No. of steers	0	0	0	0	
Slaughtered	No. of bulls	0	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	0	0	0	0	
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments: Age, mature dam and steer equivalent.<sup>5</sup>Suggest S-10 scoring system; indicate if different.

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Alabama

Location		Milstead	Milstead			
Breed of sire		Charolais	Charolais			
Breed of dam		Charolais	Charolais			
Line or group <sup>1</sup>		Slow Maturing	Fast Maturing			
Percent used in project		100	100			
Inventory as of December 31, 1978	Cows 2 years and over	44	44			
	Yearling heifers	0	0			
	Bulls and steers under 1 year	0	0			
	Heifers under 1 year	0	0			
	Bulls over 1 year	1	1			
	Steers over 1 year	0	0			
Repro. perf.	Percent <sup>2</sup> pregnant	-	-			
	Calf survival percent <sup>3</sup>	-	-			
Wean. perf.	Adj. ADG <sup>4</sup>	-	-			
	Ave. type sc. <sup>5</sup>	-	-			
Postweaning performance	No. of bulls	-	-			
	No. of heifers	-	-			
	No. of steers	-	-			
Slaughtered	No. of bulls	-	-			
	No. of heifers	-	-			
	No. of steers	-	-			
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.



Funds Expended on Beef Cattle Breeding Work in S-10 Herds  
During the Year Ending December 31, 1978State Alabama

Source	Amount Spent for Permanent Non-recurring Items	Amount Spent for Operating Expenses
Regional Research Funds		\$ 7,300
USDA funds from ARS		
State-controlled funds <sup>1</sup>	\$10,500	\$26,000

<sup>1</sup>Include all federal-grant funds, state appropriations, and receipts, if your station spends receipts, in addition to appropriated funds.

Income from the sale of cattle during the year 1978 (include total sales, whether spent on the project or not).

\$34,200

Regional Research Fund Allotment for year 1979

\$2,000



UNIVERSITY OF ARKANSAS  
Agricultural Experiment Station  
Fayetteville, Arkansas

I. PROJECT: Hatch 170

Evaluation of Performance Records of Beef Cattle.

II. OBJECTIVES:

Continue to develop practical but adequate methods of identifying, evaluating and propagating the genetic potential for the production of beef.

III. PERSONNEL:

C. J. Brown, R. S. Honea, L. O. Brown

IV. ACCOMPLISHMENTS DURING THE YEAR:

Purebred herds of Polled Hereford, Hereford, Angus, Red Poll and Charolais continue to be maintained at the Main Experiment Station near Fayetteville. Purebred herds of Red Poll and Santa Gertrudis continue to be maintained at the Pinetree location. The size and production of these herds are indicated in the inventory sheets. These herds continue to provide data relative to the general project outline. An analysis of the genetic parameters related to growth prior to 1 year is nearing completion. Estimates of genetic change in the Purebred Angus herd between 1952 and 1976 have been made. Increases in yearling weight without increases in birth weight have been made.

Cooperative work with the Livestock entomologist was initiated at the Main Station in regard to tick populations.

Cooperative work with the dairy breeding group at the Livestock and Forestry station involves the use of Simmental, Lomousin and Main Anjou sires crossed with Holstein cows to produce crossbred cows that are being compared with Hereford x Angus cows for maternal ability. It is intended in these large cows with high milk production to press reproduction as hard as possible. Some of the more productive cows have produced over 1 ton of beef by the time they are 36 months old. These data are being analyzed and will be reported in 1979.

An analysis of measurement data from a unique set of Malaysian cattle was made. The data for these analyses consisted of body weights and measures of 79 mature cows (51-116 months of age) of the Kedah-Kelantan breed. Data were taken at the Serdang and Kluang experiment station of the Malaysian Agricultural Research Development Institute (MARDI) in Peninsular Malaysia during the summer of 1977. Cows chosen to be representatives of this tropically adapted breed were bought for both locations from farmers throughout Peninsular Malaysia at approximately eight months of age. The 18 mature cows at Serdang were individually fed a ration consisting of 75% Napier grass (Pennisetum purpureum) and 25% concentrates and mineral mix. The 61 cows at Kluang were grazed on Star grass (Cynodon plectostachyum) and Guinea grass (Panicum maximum) and were supplemented with concentrates and a mineral mix.



A principal component analysis was used to study size and shape as indicated by the dependence structure among measurements. The total variation among measurements associated with the first principal component which was interpreted as a measure of general size was 40.8 percent. The second principal component contrasted cows tall at the withers, and deep at the chest with top line sloping downward and under line sloping upward from front to rear with those having less wither height and chest depth and straighter lines. This contrast accounted for 14.3 percent of the variation in body dimensions. The third principal component contrasted long, narrow and deeper cows with a more compact type. This contrast accounted for 10.7 percent of the variation in body dimension. In the paper published in the December issue of GROWTH the possible relationship to tropical adaptation of the size and shapes described by the components were discussed.

To characterize the growth of Angus cattle in the Southeastern states and to investigate a procedure of herd evaluation, static type data from 11 experiment station herds contributing to S-10 were summarized. In this summary examination of a series of curves from each location indicated characteristic lifetime development patterns at each location. The range of asymptotic (mature) weight was from 418 to 501 kgs and average general rate of maturing ranged from .0667 to .0529. Gross correlations were positive between asymptotic (mature) weight and percent pregnant, calf survival, preweaning gain and type score. Correlations between maturing rate and these traits were not consistent in sig

#### V. PUBLICATIONS:

- Ahmad, Aman, C. J. Brown and Z. B. Johnson. 1978. Size and Shape of Kedah-Kelantan Cows. GROWTH (accepted for publication in December issue).
- Brown, C. J. 1978. The Relationship of Lifetime Development Pattern to Productivity in Beef Cattle. Proc. National Breeders Roundtable May 11-12, Kansas City, Mo.
- Brown, C. J., M. L. Ray and Z. Johnson. 1978. Maturing Patterns of Hereford, Angus and Hereford-Angus Crossbred Females. J. Anim. Sci. Suppl. 47:68 (abstr.).
- Krieder, D. L., C. J. Brown and O. T. Stallcup. 1978. Patterns of Change in Peripheral Plasma Testosterone Levels of Large and Small Type Angus Bull Calves. J. Anim. Sci. Suppl. 47:372 (abstr.).
- Van Middlesworth, Jay, C. J. Brown and Z. B. Johnson. 1977. Repeatability of Calf Weight and Calf Weight to Cow Weight in Hereford and Angus. J. Anim. Sci. 45:1247-1253.

Production, Inventory and Performance Data, S-10 Herds - 1978

State Arkansas

Location		Main Sta.	Main Sta.	Main Sta.	Main Sta.	Main Sta.
Breed of sire		Angus	Hereford	P. Hereford	Charolais	Red Poll
Breed of dam		Angus	Hereford	P. Hereford	Charolais	Red Poll
Line or group <sup>1</sup>		Purebred	Purebred	Purebred	Purebred	Purebred
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	115	46	69	27	28
	Yearling heifers	31	11	19	4	0
	Bulls and steers under 1 year	24	11	17	8	---
	Heifers under 1 year	31	10	20	5	---
	Bulls over 1 year	6	1	3	3	---
	Steers over 1 year	0	0	0	0	---
Repro. perf.	Percent pregnant <sup>2</sup>	71%	76%	90%	75%	---
	Calf survival percent <sup>3</sup>	94 %	99%	96%	70%	---
Wean. perf.	Adj. ADG <sup>4</sup>	1.37	1.38	1.62	1.83	---
	Ave. type sc. <sup>5</sup>	13	13	13	13	---
Postweaning performance	No. of bulls	24	11	17	8	---
	No. of heifers	31	10	20	5	---
	No. of steers	0	0	0	0	---
Slaughtered	No. of bulls	15	3	3	1	---
	No. of heifers	4	0	0	1	---
	No. of steers	0	0	0	0	---
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

<sup>5</sup>Suggest S-10 scoring system; indicate if different.

Funds Expended on Beef Cattle Breeding Work in S-10 Herds  
During the Year Ending December 31, 1978

State Florida

Source	Amount Spent for Permanent Non-recurring Items	Amount Spent for Operating Expenses
Regional Research Funds	0	0
USDA funds from ARS	\$61,442	\$190,000
State-controlled funds <sup>1</sup>	\$45,382	\$160,318

<sup>1</sup>Include all federal-grant funds, state appropriations, and receipts, if your station spends receipts, in addition to appropriated funds.

Income from the sale of cattle during the year 1978 (include total sales, whether spent on the project or not).

\$205,700

Regional Research Fund Allotment for year 1978

0



## Production, Inventory and Performance Data, S-10 Herds - 1978

FL 2  
29State Florida

Location		Brooksville, Florida-----				
Breed of sire		Angus	Purebred Brahman	Gr. Brahman	B.G.Brahman	Brahmna
Breed of dam		Angus	Purebred Brahman	Gr. Brahman	B.G.Brahman	Angus
Line or group <sup>1</sup>		-	-	-	-	-
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	99	38	34	63	55
	Yearling heifers	43	13	9	19	-
	Bulls and steers under 1 year	51	10	7	24	17
	Heifers under 1 year	53	9	13	6	17
	Bulls over 1 year	14	5	3	4	-
	Steers over 1 year	-	-	-	-	-
Repro. perf.	Percent pregnant <sup>2</sup>	85	35	77	86	62
	Calf survival percent <sup>3</sup>	95	100	95	88	94
Wean. perf.	Adj. ADG <sup>4</sup>	1.80	2.14	2.26	2.40	2.38
	Ave. type sc. <sup>5</sup>	3	3	3	3	3
Postweaning performance	No. of bulls	51	11	7	24	17
	No. of heifers	53	9	13	6 <sup>(6)</sup>	17
	No. of steers	-	-	-	-	-
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.

S-10-1 (Rev.)

<sup>6</sup>Some heifer calves sold after weaning.

State Florida

Location						
Breed of sire		Hereford	Hereford	Red Poll	Simmental	Senepol
Breed of dam		Hereford	Hereford	x-breds	x-breds	Angus
Line or group <sup>1</sup>		Line 4	Line 6	US MARC	US MARC	-
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	56	42	125	117	-
	Yearling heifers	22	13	-	-	-
	Bulls and steers under 1 year	20	18	43	-	19
	Heifers under 1 year	13	19	-	-	15
	Bulls over 1 year	4	3	5	11	-
	Steers over 1 year	-	-	-	-	-
Repro. perf.	Percent pregnant <sup>2</sup>	72	79	87	-	-
	Calf survival percent <sup>3</sup>	88	97	97	-	94
Wean. perf.	Adj. ADG <sup>4</sup>	1.80	1.90	1.80	-	1.61
	Ave. type sc. <sup>5</sup>	3	3	3	-	3
Postweaning performance	No. of bulls	20	18	-	-	-
	No. of heifers	13	19	60 <sup>(6)</sup>	-	15
	No. of steers	-	-	43	-	19
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					

## Remarks

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.

S-10-1 (Rev.)

<sup>6</sup>Heifers sold at weaning.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Florida

Location		Belle Glade	Belle Glade	Belle Glade	Belle Glade	Belle Glade
Breed of sire		Beef Master	Brahman	Brangus	Limousin	Main Anjou
Breed of dam		Various	Various	Various	Various	Various
Line or group <sup>1</sup>						
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	77	6	90	15	14
	Yearling heifers	14	4	21	0	0
	Bulls and steers under 1 year	33	2	36	9	4
	Heifers under 1 year	35	3	32	4	9
	Bulls over 1 year	-				
	Steers over 1 year	-				
Repro. perf.	Percent <sup>2</sup> pregnant	99	100	81	100	100
	Calf survival percent <sup>3</sup>	89	71	86	93	93
Wean. perf.	Wean wt.-birth wt. <sup>4</sup>					
	Adj. ADG AGE	1.76	1.93	1.64	1.57	1.60
	Ave. type sc. <sup>5</sup>	11	12	12	11	11
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers	8	8	9	9	5
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

<sup>5</sup>Suggest S-10 scoring system; indicate if different.

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Florida

Location		Belle Glade	---	Brighton	Brighton	Brighton
Breed of sire		Simmental	---	Beefmaster	Braford	Grade Hereford
Breed of dam		Various	---	Grade Hereford	Grade Hereford	Grade Hereford
Line or group <sup>1</sup>			---			
Percent used in project		100	---	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	21	---	67	69	67
	Yearling heifers	---	---	41	30	36
	Bulls and steers under 1 year	10	---	29	47	37
	Heifers under 1 year	10	---	41	35	43
	Bulls over 1 year	---	---			
	Steers over 1 year	---	---			
Repro. perf.	Percent pregnant <sup>2</sup>	100	---	87	88	96
	Calf survival percent <sup>3</sup>	91	---	95	98	96
Wean. perf.	Adj. ADG <sup>4</sup>	1.61	---			
	Ave. type sc. <sup>5</sup>	11	---	10	10	10
Postweaning performance	No. of bulls		---			
	No. of heifers		---			
	No. of steers		---			
Slaughtered	No. of bulls		---			
	No. of heifers		---			
	No. of steers	9	---			

Remarks

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Florida

Location		RCS ONA	RCS ONA	RCS ONA	RCS ONA	RCS ONA
Breed of sire		---	Angus	Angus	Angus	Angus
Breed of dam		---	Angus	Angus x Brah	Ang x Char	Brah x Char
Line or group <sup>1</sup>		Station Mean				
Percent used in project						
Inventory as of December 31, 1978	Cows 2 years and over	437	15	6	11	4
	Yearling heifers	217	Included in	totals-----		
	Bulls and steers under 1 year	197				
	Heifers under 1 year	212				
	Bulls over 1 year					
	Steers over 1 year	208	Included in	totals-----		
Repro. perf.	Percent <sup>2</sup> pregnant	93	100	83	100	125 (twins)
	Calf survival percent <sup>3</sup>	91	80	100	91	40
Wean. perf.	Wean wt. - 70 Adj. ADG <sup>4</sup> AGE	1.67	1.29	1.58	1.46	1.47
	Ave. type sc. <sup>5</sup>	11	12	12	11	12
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

<sup>5</sup>Suggest S-10 scoring system; indicate if different.

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Florida

Location		RCS ONA	RCS ONA	RCS ONA	RCS ONA	RCS ONA
Breed of sire		Brahman	Brahman	Brahman	Brahman	Charolais
Breed of dam		Brahman	Charolais	Brah x Ang	Ang x Char	Charolais
Line or group <sup>1</sup>						
Percent used in project						
Inventory as of December 31, 1978	Cows 2 years and over	13	8	7	5	12
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant <sup>2</sup>	85	88	86	100	92
	Calf survival percent <sup>3</sup>	91	100	100	100	91
Wean. perf.	Adj. ADG <sup>4</sup>	1.34	1.91	1.85	1.93	1.79
	Ave. type sc. <sup>5</sup>	11	11	11	11	12
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Florida

Location		RCS ONA	RCS ONA	RCS ONA	RCS ONA	RCS ONA
Breed of sire		Charolais	Charolais	Charolais	F <sub>1</sub> -A x B	F <sub>1</sub> -A x B
Breed of dam		Ang x Brah	Ang x Char	Char x Brah	Angus	Brahman
Line or group <sup>1</sup>						
Percent used in project						
Inventory as of December 31, 1978	Cows 2 years and over	5	6	9	6	3
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent <sup>2</sup> pregnant	100	100	89	100	100
	Calf survival percent <sup>3</sup>	100	100	88	100	67
Wean. perf.	Adj. ADG <sup>4</sup>	1.82	1.51	1.81	1.34	1.62
	Ave. type sc. <sup>5</sup>	12	12	12	11	11
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Florida

Location		RCS ONA	RCS ONA	RCS ONA	RCS ONA	RCS ONA
Breed of sire		F <sub>1</sub> - A x B	F <sub>1</sub> - A x B	F <sub>1</sub> - A x C	F <sub>1</sub> - A x C	F <sub>1</sub> - A x C
Breed of dam		Charolais	F <sub>1</sub> - A x B	Angus	Brahman	Charolais
Line or group <sup>1</sup>			inter se			
Percent used in project						
Inventory as of December 31, 1978	Cows 2 years and over	4	22	2	4	3
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent <sup>2</sup> pregnant	50	100	100	100	100
	Calf survival percent <sup>3</sup>	100	95	100	100	100
Wean. perf.	Adj. ADG <sup>4</sup>	1.64	1.67	1.37	1.81	1.6
	Ave. type sc. <sup>5</sup>	12	12	10	12	11
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					

## Remarks

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Florida

Location		RCS ONA	RCS ONA	RCS ONA	RCS ONA	RCS ONA
Breed of sire		F <sub>1</sub> - A x C	F <sub>1</sub> - B x C	F <sub>1</sub> - B x C	F <sub>1</sub> - B x C	F <sub>1</sub> - B x C
Breed of dam		F <sub>1</sub> - A x C	Angus	Brahman	Charolais	F <sub>1</sub> - B x C
Line or group <sup>1</sup>		inter se				inter se
Percent used in project						
Inventory as of December 31, 1978	Cows 2 years and over	24	2	5	3	22
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant <sup>2</sup>	100	0	60	100	100
	Calf survival percent <sup>3</sup>	100	0	100	50	73
Wean. perf.	Adj. ADG <sup>4</sup>	1.53		1.37	1.49	1.86
	Ave. type sc. <sup>5</sup>	12		10	11	11
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Florida

Location		RCS ONA	RCS ONA	RCS ONA		
Breed of sire		Santa Gert.	Brahman	Charolais		
Breed of dam		Santa Gert.	Brahman	Grade Charolais		
Line or group <sup>1</sup>						
Percent used in project						
Inventory as of December 31, 1978	Cows 2 years and over	34	45	48		
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant <sup>2</sup>	100	73	83		
	Calf survival percent <sup>3</sup>	79	91	95		
Wean. perf.	Adj. ADG <sup>4</sup>	1.61	1.63	1.74		
	Ave. type sc. <sup>5</sup>	10	11	11		
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					

## Remarks

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.



State Florida

Location		Beef Res. Unit	Beef Res. Unit	Beef Res. Unit	Beef Res. Unit	Beef Res. Unit
Breed of sire		Angus	Brown Swiss	Angus or Swiss	Swiss	Angus
Breed of dam		Angus	Brown Swiss	Angus or Swiss	F <sub>1</sub>	F <sub>1</sub>
Line or group <sup>1</sup>				F <sub>1</sub>	Backcross	Backcross
Percent used in project						
Inventory as of December 31, 1978	Cows 2 years and over	38	28	39	26	28
	Yearling heifers	4	8	31	--	9
	Bulls and steers under 1 year	14	9	16	10	16
	Heifers under 1 year	19	14	16	10	16
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant <sup>2</sup>	100	89	90	92	100
	Calf survival percent <sup>3</sup>	85	96	94	100	89
Wean. perf.	Wean wt.-birth wt. Adj. ADG <sup>4</sup> AGE	1.63	2.25	2.12	2.06	1.99
	Ave. type sc. <sup>5</sup>	---	---	---	---	---
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

<sup>5</sup>Suggest S-10 scoring system; indicate if different.



GEORGIA COASTAL PLAIN EXPERIMENT STATION  
Tifton, Georgia

I. PROJECT: Hatch 224 (S-10)

II. OBJECTIVES:

To estimate general combining ability of breeds, specific combining ability in breed crosses and heterosis of various types of crosses.

To compare performance of crossbred Simmental x Polled Hereford cattle with Polled Herefords and ultimately grade up to purebred Simmentals.

III. PERSONNEL:

W. E. Neville, Jr. and W. C. McCormick

IV. ACCOMPLISHMENTS DURING THE YEAR:

Tifton. The Angus and Polled Hereford cows were mated naturally while the Simmental-cross cows were synchronized with Syncromate-B and artificially inseminated. A purebred Simmental bull was turned with the Simmental-cross cows 18 days after A. I. to serve as a "clean-up" bull. Twenty-one 7/8 and 15/16 Simmental calves were born and 18 were weaned in 1978. Calves of all three breeds were born in January to March and weaned in September. Bull and cull heifer calves from the previous year's calf crop were fed post-weaning to compare performance on slotted floor vs conventional floor and no Rumensin vs Rumensin (30 gm/ton). Replacement females were selected at weaning and fed to gain at a moderate rate post-weaning.

Table 1 is a summary of 140-day ADG of bulls by breed, sire, facility and diet.

Table 2 is a summary of the 126-day performance of fed heifers by facility and diet and the 196-day performance of replacement heifers by breed.

Reidsville. Straightbred bulls of Angus and Santa Gertrudis and thier reciprocal crosses ( $F_1$ ) have been mated to straightbred Polled Hereford cows. Calves of the preceding breed compositions (which constituted the second year's breeding) have been weaned and male calves to be used in next year's breeding to grade Polled Hereford cows are now on a post-weaning feeding program. The post-weaning performance on pasture of last year's bulls is summarized in table 3.

V. FUTURE PLANS:

During 1979 at Reidsville will be the first year's calf crop sired by straightbred Angus and Santa Gertrudis and their reciprocal-cross bulls and out of straightbred Polled Hereford dams. Performance data will be collected according to project outline. Also, for the third

year Angus and Santa Gertrudis cows will produce straightbred and crossbred calves of each breed combination from which bulls will be saved for later use. At Tifton, studies will be continued on Angus, Polled Herefords and Simmentals.

VI. PUBLICATIONS DURING THE YEAR:

Neville, W. E., Jr., B. G. Mullinix, Jr., J. B. Smith and W. C. McCormick. 1978. Growth patterns for pelvic dimensions and other body measurements of beef females. J. Anim. Sci. 47:1080.

Neville, W. E., Jr., J. B. Smith, B. G. Mullinix, Jr., and W. C. McCormick. 1978. Relationships between pelvic dimensions, between pelvic dimensions and hip height and estimates of heritabilities. J. Anim. Sci. 47:1089.



TABLE 1. POST-WEANING PERFORMANCE OF 1977 BULL CALVES

Breed	Sire	No. Bulls	140-day ADG, lb.	Final age days	Final wt., lb.	WPDA, lb.
Angus	406	12	2.89	400	963	2.41
Angus	935	9	3.29	395	1032	2.61
PH	367	4	3.26	398	969	2.43
PH	475	4	3.41	377	938	2.49
PH	541	7	3.31	385	963	2.51
PH	727	6	2.97	381	885	2.32
PH	976	6	3.11	398	982	2.47
Sim	Chief	1	4.14	390	1260	3.23
Sim	Samson	1	3.71	419	1210	2.89
Sim	M.D.	4	3.42	345	993	2.88

Item	Conventional feedlot	Slotted floor	No Rumensin	Rumensin
Bulls, no.	16	32	24	24
ADG, 140 days, lb.	3.21	2.98	3.17	2.94
Feed/lb gain	6.67	6.54	6.78	6.39

TABLE 2. POST-WEANING PERFORMANCE OF 1977 HEIFER CALVES

Heifers fed in feedlot				
Item	Conventional feedlot	Slotted floor	No Rumensin	Rumensin
Heifers, no.	16	16	16	16
ADG, 126 days, lb.	2.51	2.50	2.55	2.46
Feed/lb. gain	7.17	7.23	7.84	6.54

Replacement heifers				
Breed	No. Heifers	196-day ADG, lb.	Final age, days	WPDA, lb.
Angus	14	.93	429	1.52
PH	19	1.00	424	1.55
Sim	2	.96	431	1.45

TABLE 3. POST-WEANING PERFORMANCE ON PASTURE OF 1977 ANGUS, S. GERTRUDIS AND RECIPROCAL CROSS BULLS AT REIDSVILLE

Breed	No. Bulls	140-day ADG, lb.	Final age, days	Final wt., lb.	WPDA, lb.
Angus (A)	8	2.13	433	805	1.86
S. Gertrudis (SG)	10	2.09	420	870	2.07
A x SG	6	2.24	425	908	2.14
SG x A	3	2.48	447	880	1.97

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Georgia

Location	Tifton	Tifton	Tifton		
Breed of sire	P. Hereford	Angus	Simmental		
Breed of dam	P. Hereford	Angus	S x PH		
Line or group <sup>1</sup>	Purebred	Purebred	Sim x		
Percent used in project	60	60	60		
Inventory as of December 31, 1978	Cows 2 years and over	65	37	22	
	Yearling heifers	17	12	2	
	Bulls and steers under 1 year	29	19	8	
	Heifers under 1 year	16	13	7	
	Bulls over 1 year	5	3	0	
	Steers over 1 year	0	0	0	
Repro. perf.	Percent pregnant <sup>2</sup>	94.9	96.8	92.9	
	Calf survival percent <sup>3</sup>	88.9	98.0	85.7	
Wean. perf.	Adj. ADG <sup>4</sup>	450	498	556	
	Ave. type sc. <sup>5</sup>				
Postweaning performance	No. of bulls	29	19	8	
	No. of heifers	25	26	13	
	No. of steers				
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments: 205-day weight adj. for age of dam.<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Georgia

Location	Reidsville	Reidsville	Reidsville		
Breed of sire	Angus	Santa Gert.	P. Hereford		
Breed of dam	S. Gert. Angus	Angus Santa Gert.	P. Hereford		
Line or group <sup>1</sup>	Grade	Grade	Grade		
Percent used in project	100	100	100		
Inventory as of December 31, 1978	Cows 2 years and over	72	72	300	
	Yearling heifers	28	24	70	
	Bulls and steers under 1 year	15	14	0	
	Heifers under 1 year	19	13	98	
	Bulls over 1 year	5	5	4	
	Steers over 1 year				
Repro. perf.	Percent pregnant <sup>2</sup>	76.4	66.0	91.8	
	Calf survival percent <sup>3</sup>	96.0	83.0	95.0	
Wean. perf.	Adj. ADG <sup>4</sup>	1.56	1.58	1.38	
	Ave. type sc. <sup>5</sup>				
Postweaning performance	No. of bulls				
	No. of heifers				
	No. of steers				
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments: None.<sup>5</sup>Suggest S-10 scoring system; indicate if different.



Funds Expended on Beef Cattle Breeding Work in S-10 Herds  
During the Year Ending December 31, 1978State Georgia

Source	Amount Spent for Permanent Non-recurring Items	Amount Spent for Operating Expenses
Regional Research Funds		\$40,208
USDA funds from ARS		
State-controlled funds <sup>1</sup>		\$26,116

<sup>1</sup>Include all federal-grant funds, state appropriations, and receipts, if your station spends receipts, in addition to appropriated funds.

Income from the sale of cattle during the year 1978 (include total sales, whether spent on the project or not).

\$63,829

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Regional Research Fund Allotment for year 1977-78

\$44,630

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UNIVERSITY OF KENTUCKY  
Agricultural Experiment Station  
Lexington, Kentucky

- I. PROJECT: Animal Science 310 (S-10)  
Estimation of genetic parameters for various preweaning and postweaning beef cattle traits.

II. OBJECTIVES:

To estimate magnitude of genetic parameters for various preweaning and postweaning beef cattle traits when the estimates are obtained from two populations where the criteria of selection is different for each population.

III. PERSONNEL:

F. A. Thrift, E. F. Gray and D. K. Aaron

IV. ACCOMPLISHMENTS DURING THE YEAR:

A. Genetic Parameter Study

Preweaning records on 2864 calves from the Kentucky, North Carolina and Tennessee Stations were utilized to estimate heritabilities of birth weight and weaning weight. Each station maintained a select line as well as a genetic control line and heritability values were calculated separately for each sex and line of calf combination by combining data from the three stations. Heritability values for birth weight were  $.188 \pm .093$  and  $.335 \pm .178$  for bull calves from the select and control lines, respectively. Corresponding values for heifer calves were  $.392 \pm .122$  and  $.434 \pm .203$ , respectively. Heritability values for weaning weight were  $.274 \pm .114$  and  $.388 \pm .206$  for bull calves from the select and control lines, respectively. Corresponding values for heifer calves were  $.156 \pm .109$  and  $.392 \pm .222$ , respectively. Within sex of calf, heritability values are not significantly different for the select and control lines for either trait.

B. Heterosis Study

The majority of research results involving crossing of the Angus and Hereford breeds indicate positive heterosis values for birth weight, weaning weight and weaning type score. The purpose of this study was to estimate heterosis for birth weight, weaning weight and weaning type score obtained from crossing of Angus and Hereford breeds under commercial conditions and to compare these estimates with results realized when the same two breeds were crossed under controlled experimental conditions. Weaning weights and weaning type scores were collected during the 6-year period, 1969 through 1974; however, birth weights were recorded only during the 3-year period, 1972 through 1974. Number of observations for the three traits was 143, 600 and 600, respectively, for birth weight, weaning weight and weaning type score. Heterosis estimates were 0, 4.8 ( $P < .01$ ) and 1.8% ( $P < .05$ ), respectively, for birth weight, weaning weight and weaning type score. With exception of birth



weight, these heterosis estimates realized under commercial conditions agree reasonably well with results presented in the literature based on experiments involving crossing of the Angus and Hereford breeds.

V. FUTURE PLANS:

A. Genetic Parameter Study

Calculate genetic parameters for various postweaning traits for the select and control lines.

B. Grading-Up Study

Data collected in cooperation with a large commercial beef cattle operation will be utilized to evaluate performance of 1/2 and 3/4 Maine-Anjou calves as well as 1/2 and 3/4 Simmental calves.

VI. PUBLICATIONS DURING THE YEAR:

Gray, E. F., F. A. Thrift and C. W. Absher. 1978. Heterosis expression for preweaning traits under commercial beef cattle conditions. J. Anim. Sci. 47:370.

Thrift, F. A., S. R. Gallion and C. W. Absher. 1978. Breed of sire and dam comparisons for preweaning traits under commercial beef cattle conditions. J. Anim. Sci. 46:977.

VII. PUBLICATIONS PLANNED:

None

Funds Expended on Beef Cattle Breeding Work in S-10 Herds  
During the Year Ending December 31, 1978State Kentucky

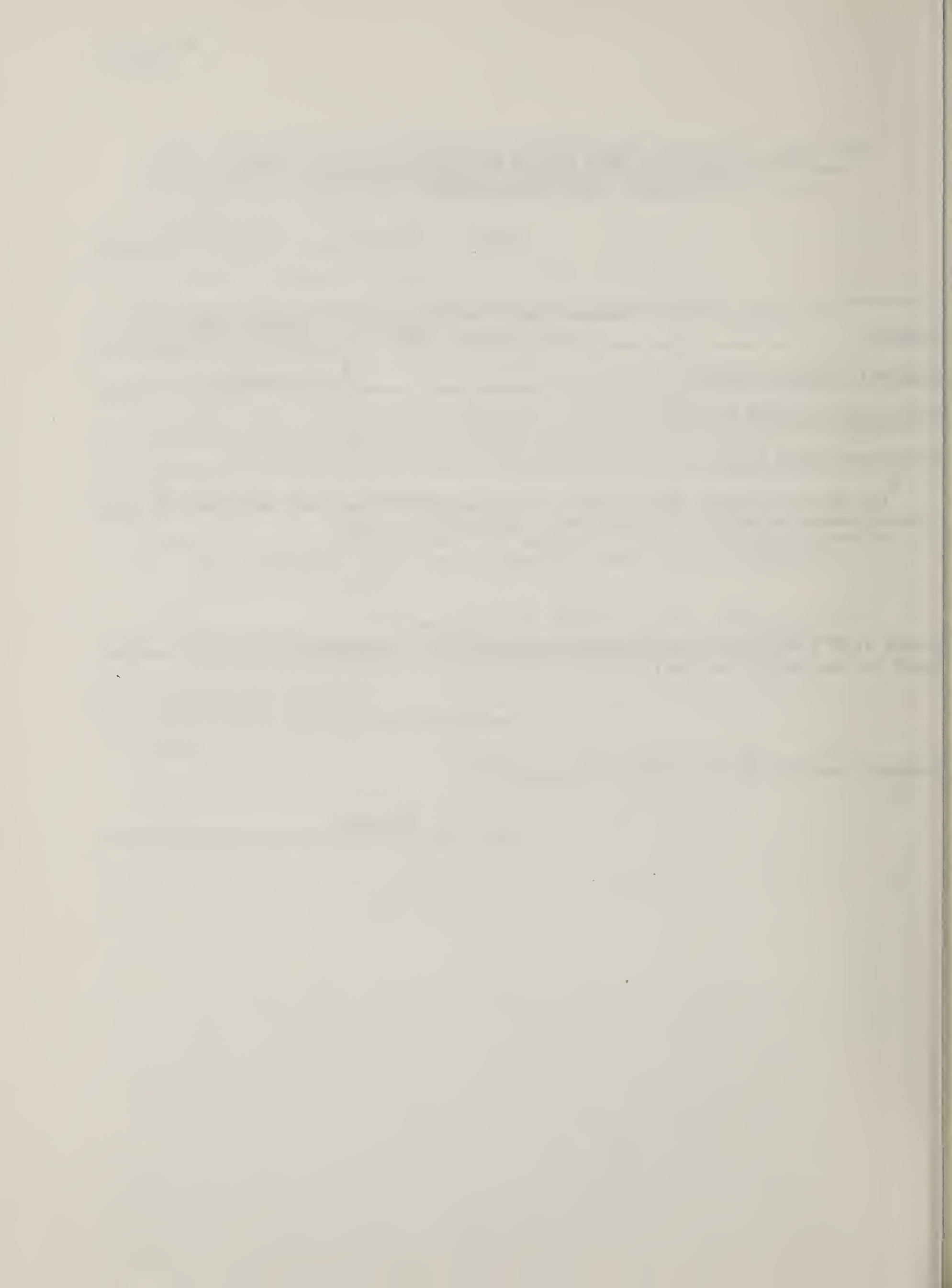
Source	Amount Spent for Permanent Non-recurring Items	Amount Spent for Operating Expenses
Regional Research Funds		\$16,600
USDA funds from ARS		
State-controlled funds <sup>1</sup>		

<sup>1</sup>Include all federal-grant funds, state appropriations, and receipts, if your station spends receipts, in addition to appropriated funds.

Income from the sale of cattle during the year 1978 (include total sales, whether spent on the project or not).

Regional Research Fund Allotment for year 1978

\$16,600





LOUISIANA STATE UNIVERSITY  
Agricultural Experiment Station  
Baton Rouge, Louisiana

I. PROJECT: Hatch 605 (Revised)

General Title: Breeding methods for beef cattle in the Southern Region.

Specific Title: Evaluation of systematic rotational crossbreeding plans for producing beef cattle in the Gulf Coast region.

II. OBJECTIVES:

To evaluate the productivity, usefulness, practicality and management of systematic rotational crossbreeding systems using the Angus, Brahman, Charolais and Hereford breeds.

To estimate for these breeds genetic parameters of biological and economic traits.

To determine the degree of heterotic advantage maintained in subsequent generations of rotational crossbreeding.

To determine the relative productivity of various types of crossbred cows.

III. PERSONNEL:

Donald E. Franke, Thomas D. Bidner, F. Glen Hembry and Ted O. McRae

IV. ACCOMPLISHMENTS DURING THE YEAR:

A. Scope and nature of work:

The 1978 calf crop was the fourth of four to be produced in Phase II of Project 605. This phase includes the production of straightbred Angus (A), Brahman (B), Charolais (C) and Hereford (H) controls and three two-breed rotation crosses (B<sub>5</sub>A<sub>3</sub>, B<sub>5</sub>C<sub>3</sub>, B<sub>5</sub>H<sub>3</sub>), three three-breed rotation crosses (A<sub>5</sub>C<sub>2</sub>B<sub>1</sub>, H<sub>5</sub>A<sub>2</sub>B<sub>1</sub>, H<sub>5</sub>C<sub>2</sub>B<sub>1</sub>) and one four-breed rotation (C<sub>4</sub>H<sub>2</sub>A<sub>1</sub>B<sub>1</sub>).

Because of a loss of approximately one-third of the cows due to Brucellosis, too few steer calves were available to split into pasture and feedlot groups for postweaning performance. All steers were placed in the feedlot.

Cows finishing this phase in the project were sold for slaughter in October. Heifers born in 1976 were bred in late 1977 to drop calves in late 1978. These calves were sired by Shorthorn and Red Poll bulls.

## B. Research results:

The number of cows exposed to drop calves in 1978 was reduced below the normal number because of a Brucellosis outbreak in 1976. Losses within cow lines were about equal. Birth and weaning weight on 151 calves averaged 69.7 and 467 pounds, respectively (Table 1). Line weaning weight means ranged from 397 pounds for Hereford calves to 519 pounds for C<sub>4</sub>H<sub>2</sub>A<sub>1</sub>B<sub>1</sub> calves. Three-breed rotation calves were heavier than two-breed rotation calves, however, sire breed effect could have contributed to this difference. Crossbred calves tended to be fatter at weaning than straightbred calves, although Charolais calves were similar to crossbred calves for conformation score. Reproductive rates were lower than normal and probably due to a combination of the Brucellosis outbreak and stressful winter prior to the breeding season in 1977.

Carcass data on steers born in 1977 were obtained in 1978. Statistical analysis indicated no line by management interaction. Means are presented in Table 2. Charolais sired steers were heavier at slaughter and had heavier hot carcass weights. Carcass grades ranged from low to high good except the Brahman which graded standard. Charolais sired steers and B5C3 steers had larger rib eyes. Warner-Bratzler shear values ranged from 9.8 for A5C2B<sub>1</sub> to 12.4 for Brahman steers.

## V. FUTURE PLANS:

Phase III will begin with the breeding season in 1979. Most lines of replacement heifers are up to full strength even though Brucellosis did have some effect on numbers. So far all replacement females have tested negative to Brucellosis tests.

## VI. PUBLICATIONS DURING 1978:

Babcock, D. S. 1978. Probable producing ability of straightbred and crossbred beef cows. M.S. Thesis. La. State Univ., Baton, Rouge.

Babcock, D. S. and D. E. Franke. 1978. Pen and breed effects for steer postweaning performance. J. Anim. Sci. Suppl. (abstr.).

Babcock, D. S. and D. E. Franke. 1978. Postweaning performance of straightbred and crossbred beef steers. La. Livestock Prod. Day Rpt. 18:124.

Dixon, J. E., D. E. Franke, H. V. Cox and W. Trahan. 1978. Report on the vaccination of adult beef cattle using Brucella Strain 19 vaccine. La. Livestock Prod. Day Rpt. 18:161.

Franke, D. E. 1978. Growth traits of straightbred and crossbred beef heifers. La. Livestock Prod. Day Rpt. 18:104.

Taylor, M. S. 1978. Heterosis and productivity estimates for preweaning traits in Brahman crossbred cattle. M.S. Thesis. La. State Univ., Baton Rouge.

Taylor, M. S. and D. E. Franke. 1978. Heterosis for production traits in Brahman crossbred cattle. J. Anim. Sci. Suppl. (abstr.).



LOUISIANA STATE UNIVERSITY  
Agricultural Experiment Station  
Baton Rouge, Louisiana

I. PROJECT: Hatch 605 (Revised)

General Title: Breeding methods for beef cattle in the Southern Region.

Specific Title: Evaluation of systematic rotational crossbreeding plans for producing beef cattle in the Gulf Coast region.

II. OBJECTIVES:

To evaluate the productivity, usefulness, practicality and management of systematic rotational crossbreeding systems using the Angus, Brahman, Charolais and Hereford breeds.

To estimate for these breeds genetic parameters of biological and economic traits.

To determine the degree of heterotic advantage maintained in subsequent generations of rotational crossbreeding.

To determine the relative productivity of various types of crossbred cows.

III. PERSONNEL:

Donald E. Franke, Thomas D. Bidner, F. Glen Hembry and Ted O. McRae

IV. ACCOMPLISHMENTS DURING THE YEAR:

A. Scope and nature of work:

The 1978 calf crop was the fourth of four to be produced in Phase II of Project 605. This phase includes the production of straightbred Angus (A), Brahman (B), Charolais (C) and Hereford (H) controls and three two-breed rotation crosses (B5A3, B5C3, B5H3), three three-breed rotation crosses (A5C2B1, H5A2B1, H5C2B1) and one four-breed rotation (C4H2A1B1).

Because of a loss of approximately one-third of the cows due to Brucellosis, too few steer calves were available to split into pasture and feedlot groups for postweaning performance. All steers were placed in the feedlot.

Cows finishing this phase in the project were sold for slaughter in October. Heifers born in 1976 were bred in late 1977 to drop calves in late 1978. These calves were sired by Shorthorn and Red Poll bulls.



## B. Research results:

The number of cows exposed to drop calves in 1978 was reduced below the normal number because of a Brucellosis outbreak in 1976. Losses within cow lines were about equal. Birth and weaning weight on 151 calves averaged 69.7 and 467 pounds, respectively (Table 1). Line weaning weight means ranged from 397 pounds for Hereford calves to 519 pounds for C<sub>4</sub>H<sub>2</sub>A<sub>1</sub>B<sub>1</sub> calves. Three-breed rotation calves were heavier than two-breed rotation calves, however, sire breed effect could have contributed to this difference. Crossbred calves tended to be fatter at weaning than straightbred calves, although Charolais calves were similar to crossbred calves for conformation score. Reproductive rates were lower than normal and probably due to a combination of the Brucellosis outbreak and stressful winter prior to the breeding season in 1977.

Carcass data on steers born in 1977 were obtained in 1978. Statistical analysis indicated no line by management interaction. Means are presented in Table 2. Charolais sired steers were heavier at slaughter and had heavier hot carcass weights. Carcass grades ranged from low to high good except the Brahman which graded standard. Charolais sired steers and B5C3 steers had larger rib eyes. Warner-Bratzler shear values ranged from 9.8 for A5C2B<sub>1</sub> to 12.4 for Brahman steers.

## V. FUTURE PLANS:

Phase III will begin with the breeding season in 1979. Most lines of replacement heifers are up to full strength even though Brucellosis did have some effect on numbers. So far all replacement females have tested negative to Brucellosis tests.

## VI. PUBLICATIONS DURING 1978:

Babcock, D. S. 1978. Probable producing ability of straightbred and crossbred beef cows. M.S. Thesis. La. State Univ., Baton, Rouge.

Babcock, D. S. and D. E. Franke. 1978. Pen and breed effects for steer postweaning performance. J. Anim. Sci. Suppl. (abstr.).

Babcock, D. S. and D. E. Franke. 1978. Postweaning performance of straightbred and crossbred beef steers. La. Livestock Prod. Day Rpt. 18:124.

Dixon, J. E., D. E. Franke, H. V. Cox and W. Trahan. 1978. Report on the vaccination of adult beef cattle using Brucella Strain 19 vaccine. La. Livestock Prod. Day Rpt. 18:161.

Franke, D. E. 1978. Growth traits of straightbred and crossbred beef heifers. La. Livestock Prod. Day Rpt. 18:104.

Taylor, M. S. 1978. Heterosis and productivity estimates for preweaning traits in Brahman crossbred cattle. M.S. Thesis. La. State Univ., Baton Rouge.

Taylor, M. S. and D. E. Franke. 1978. Heterosis for production traits in Brahman crossbred cattle. J. Anim. Sci. Suppl. (abstr.).

TABLE 1. AVERAGES FOR PREWEANING TRAITS BY LINE, 1978 CALVES

Line	No. cows	Calving rate	Weaning rate	Average birth dt.	Average birth wt.	Age at weaning	Average weaning wt.	Cond. score	Conf. score	Oct. cow weight
1	22	63.6	59.1	45.7	60.0	229	419	10.9	10.3	927
2	34	50.0	23.5	48.9	55.5	219	397	10.4	10.8	892
3	18	77.8	61.1	54.3	83.8	217	484	10.9	11.7	1121
4	21	52.4	52.4	49.1	66.5	225	367	10.0	10.0	944
5	21	61.9	61.9	54.2	72.2	220	475	11.2	11.2	953
6	19	73.7	57.9	54.6	72.5	214	467	10.6	11.0	1133
7	23	69.6	65.2	63.4	74.5	210	447	11.0	10.9	1021
8	24	87.5	83.3	47.0	61.3	228	499	11.3	11.4	1076
9	24	87.5	75.0	49.5	66.9	212	454	11.0	10.8	984
10	22	86.4	77.3	47.7	72.4	226	500	11.5	11.4	1090
11	21	76.2	76.2	48.4	83.0	226	519	11.3	11.9	1024
Average	249	69.9	61.0	51.1	69.7	223	467	11.1	11.2	1022

TABLE 2. LEAST SQUARE MEANS FOR POSTWEANING TRAITS, 1977 STEERS

Variable	Final feedlot wt., kg	Feedlot ADG, kg	Hot Carcass wt., kg	Carcass wt.PDA, kg	Carcass quality grade	Fat thick- ness cm	Yield grade	Rib eye area cm <sup>2</sup>	W-B shear kg per 6.45 cm <sup>2</sup>
Line									
A	427	1.2	259	.55	11.3	1.23	2.8	72.7	10.6
B	344	.9	198	.45	6.7	.38	1.7	60.6	12.4
C	505	1.4	305	.66	9.7	.66	2.0	84.2	9.9
H	403	1.1	232	.49	9.6	1.07	2.6	67.3	11.9
B <sub>5</sub> A <sub>3</sub>	461	1.3	270	.58	8.6	.85	2.5	70.5	9.9
B <sub>5</sub> C <sub>3</sub>	455	1.2	279	.63	9.2	.82	2.0	81.7	10.1
B <sub>5</sub> H <sub>3</sub>	434	1.3	262	.58	8.5	.72	2.2	70.0	11.1
A <sub>5</sub> C <sub>2</sub> B <sub>1</sub>	485	1.3	288	.62	10.7	1.07	2.8	74.4	9.8
H <sub>5</sub> A <sub>2</sub> B <sub>1</sub>	461	1.2	272	.58	9.3	1.14	2.8	72.2	11.4
H <sub>5</sub> C <sub>2</sub> B <sub>1</sub>	483	1.2	284	.61	9.4	1.27	3.0	71.9	10.1
C <sub>4</sub> H <sub>2</sub> A <sub>1</sub> B <sub>1</sub>	502	1.3	308	.65	11.0	1.14	2.9	79.8	10.1
Postweaning management									
Feedlot	435	1.1	270	.63	9.8	1.05	2.7	73.1	10.2
Feedlot after pasture	467	1.4	269	.53	9.1	.83	2.2	73.3	11.2



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Louisiana

Location		Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire		Angus	Brahman	Charolais	Hereford	Brahman
Breed of dam		Angus	Brahman	Charolais	Hereford	A B <sub>1</sub>
Line or group <sup>1</sup>		1	2	3	4	5
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1978	Cows 2 years * and over	15	12	15	14	17
	Yearling * heifers	10	7	4	11	6
	<del>XXXXXXX</del> steers under 1 year	8	1	4	8	6
	Heifers under * 1 year	6	7	8	2	7
	Bulls over 1 year	3	2	1	2	
	Steers over 1 year	-	-	-	-	-
Repro. perf.	Percent pregnant <sup>2</sup>	63.6	50.0	77.8	52.4	61.9
	Calf survival percent <sup>3</sup>	92.9	47.0	78.5	100.0	100.0
Wean. perf.	Adj. ADG <sup>4</sup>	1.57	1.56	1.85	1.33	1.83
	Ave. type sc. <sup>5</sup>	10.3	10.8	11.7	10.0	11.2
Postweaning performance	No. of bulls	-	-	-	-	-
	No. of heifers	10	7	4	11	6
	No. of steers <sup>1977</sup>	9	7	8	5	11
Slaughtered	No. of bulls	-	-	-	-	-
	No. of heifers	-	-	-	-	-
	No. of steers <sup>1977</sup>	9	7	8	5	11
Remarks *Inventory is of females for next generation.						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments: None.<sup>5</sup>Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1978

State Louisiana

Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Brahman	Brahman	Angus	Hereford	Hereford
Breed of dam	C <sub>3</sub> B <sub>1</sub>	H <sub>3</sub> B <sub>1</sub>	C <sub>2</sub> A <sub>1</sub> B <sub>1</sub>	A <sub>2</sub> H <sub>1</sub> B <sub>1</sub>	C <sub>2</sub> H <sub>1</sub> B <sub>1</sub>
Line or group <sup>1</sup>	6	7	8	9	10
Percent used in project	100	100	100	100	100
Inventory as of December 31, 1978	Cows 2 years * and over	18	26	25	21
	Yearling * heifers	11	8	12	7
	Bulls and steers under 1 year	2	9	10	11
	Heifers under * 1 year	9	6	10	6
	Bulls over 1 year	-	-	-	-
	Steers over 1 year	-	-	-	-
Repro. perf.	Percent pregnant <sup>2</sup>	73.7	69.6	87.5	87.5
	Calf survival percent <sup>3</sup>	78.5	93.6	95.2	85.7
Wean. perf.	Adj. ADG <sup>4</sup>	1.84	1.77	1.91	1.82
	Ave. type sc. <sup>5</sup>	11.0	10.9	11.4	10.8
Postweaning performance	No. of bulls	-	-	-	-
	No. of heifers <sup>1977</sup>	11	8	12	7
	No. of steers <sup>1977</sup>	3	11	8	12
Slaughtered	No. of bulls	-	-	-	-
	No. of heifers	-	-	-	-
	No. of steers <sup>1977</sup>	3	11	8	12

Remarks \*Inventory is of females for next generation.

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

None.

<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Louisiana

Location		Baton Rouge				
Breed of sire		Charolais				
Breed of dam		H <sub>2</sub> A <sub>1</sub> B <sub>1</sub>				
Line or group <sup>1</sup>		11				
Percent used in project		100				
Inventory as of December 31, 1978	Cows 2 years and over *	16				
	Yearling heifers *	9				
	<del>Bulls and</del> steers under 1 year	8				
	Heifers under 1 year *	9				
	Bulls over 1 year					
	Steers over 1 year	-				
Repro. perf.	Percent pregnant <sup>2</sup>	76.2				
	Calf survival percent <sup>3</sup>	100				
Wean. perf.	Adj. ADG <sup>4</sup>	1.93				
	Ave. type sc. <sup>5</sup>	11.9				
Postweaning performance	No. of bulls	-				
	No. of heifers	9				
	No. of steers	3				
Slaughtered	No. of bulls	-				
	No. of heifers	-				
	No. of steers	3				
Remarks *Inventory is of females for next generation.						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments: None.<sup>5</sup>Suggest S-10 scoring system; indicate if different.





NORTH CAROLINA STATE UNIVERSITY  
Agricultural Experiment Station  
Raleigh, North Carolina

I. PROJECT: Animal Science 1010

Breeding methods for beef cattle in the Southern Region

II. OBJECTIVES:

1. To estimate genetic parameters associated with rates of growth and maturing and other characters of biological and economic importance.
  - (A) To measure the effectiveness of selection to increase 205-day weight and postweaning gain to 365 days, and to evaluate correlated responses in other traits.
  - (B) To investigate phenotypic and genetic relationships between growth and milk production.
  - (C) To investigate phenotypic and genetic relationships between growth and measures of reproductive fitness.

III. PERSONNEL:

E. U. Dillard, T. N. Blumer, O. W. Robison

IV. ACCOMPLISHMENTS DURING THE YEAR:

At the beginning of the 1977 breeding season a total of 322 cows were on inventory for the two herds at Raleigh and Plymouth. Since ideally 100 live calves were desired in each herd the breeding season was shorted with plans to terminate it when approximately 110 cows were pregnant in each herd. This goal was achieved in the Plymouth herd, but in the Raleigh herd, for reasons not completely clear, the conception rate was very poor and so a very poor calf crop resulted. Prewaning average daily gain for the calves born in 1978 at Plymouth was about the same as for 1977, however, some calves were heavier at 205 days than any previously born in this project. At Raleigh, 1978 calf average daily gain was up about .1 kg per day over 1977 calves. Conformation scores of the calves at weaning for the two years were not greatly different in either herd.

Fifty (50) bulls born at Plymouth in 1977 completed the postweaning gain test in 1978. Thirty-two of these were slaughtered for carcass evaluation. All selections of prospective sires and alternates were made from this herd because of disease problems in the Raleigh bulls which led to a cancellation of the postweaning tests at that location. Average gain from 205 to 365 days of age was 181.64 kg for 18 bulls in the weaning weight line, 184.54 kg for 20 bulls in the postweaning gain line and 164.82 kg for 12 bulls in the control group.

Because of the poor conception rate at Raleigh in 1977 and the following disease problem in the bulls on test, the breeding herd for 1978 at Raleigh was much smaller than in recent years. Several steps were taken to try and alleviate 1977-78 conditions but the 1979 calf will be much reduced in that herd. For 1979, however, the herd should be back near normal size by having kept back some open cows in 1978.

Two papers relating to milk yield in these herds were published in 1978 as was one paper relating to feed efficiency and gain of bulls being individually fed in the postweaning gain tests. Essential results were reported in last year's annual report. One other paper relating to reproduction of replacement heifers in these herds has been accepted for publication in the Journal of Animal Science and a second is being reviewed for the same journal. One other paper relating to the full feed efficiency and carcass data is in final state of preparation.

#### V. FUTURE PLANS:

The project will be continued according to plan. No changes are anticipated for this year. Continued preparation of material for publication is planned.

#### VI. PUBLICATIONS:

Dillard, E. U., M. K. M. Yusuff and O. W. Robison. 1978. Milk production in Hereford cows. II. Heritabilities and repeatabilities. J. Anim. Sci. 47:137-141.

Mavrogenis, A. P., E. U. Dillard and O. W. Robison. 1978. Genetic analysis of postweaning performance of Hereford bulls. J. Anim. Sci. 47:1004-1013.

Robison, O. W., M. K. M. Yusuff and E. U. Dillard. 1978. Milk production in Hereford cows. I. Means and correlations. J. Anim. Sci. 47:131-136.

#### VII. COOPERATING AGENCIES:

N. C. Department of Agriculture



State North Carolina

Location		Raleigh	Raleigh	Raleigh		
Breed of sire		H	H	H		
Breed of dam		H	H	H		
Line or group <sup>1</sup>		1	2	3		
Percent used in project		100	100	100		
Inventory as of December 31, 1978	Cows 2 years and over	37	40	20		
	Yearling heifers	15	21	5		
	Bulls and steers under 1 year					
	Heifers under 1 year	16	16	5		
	Bulls over 1 year	6	6	6		
	Steers over 1 year	-	-	-		
Repro. perf.	Percent pregnant <sup>2</sup>	51	53	43		
	Calf survival percent <sup>3</sup>	85	82	75		
Wean. perf.	Adj. ADG <sup>4</sup>	1.31 <sup>(29)</sup>	1.50 <sup>(33)</sup>	1.43 <sup>(9)</sup>		
	Ave. type sc. <sup>5</sup>	10.0	10.4	10.5		
Postweaning performance	No. of bulls <sup>6</sup>					
	No. of heifers	15	21	5		
	No. of steers	-	-	-		
Slaughtered	No. of bulls <sup>6</sup>					
	No. of heifers	-	-	-		
	No. of steers	-	-	-		
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.

S-10-1 (Rev.)

<sup>6</sup>Because of sickness in bulls the postweaning phase of the experiment was terminated for this herd. Feed lot performance abnormal. Carcass data not taken.

1978 calves

1977 calves

## Production, Inventory and Performance Data, S-10 Herds - 1978

State North Carolina

1978 calves

1977 calves

Location		Plymouth	Plymouth	Plymouth		
Breed of sire		H	H	H		
Breed of dam		H	H	H		
Line or group <sup>1</sup>		1	2	3		
Percent used in project		100	100	100		
Inventory as of December 31, 1978	Cows 2 years and over	27	39	17		
	Yearling heifers	11	21	3		
	Bulls and steers under 1 year	13	27	9		
	Heifers under 1 year	15	20	7		
	Bulls over 1 year	-	-	-		
	Steers over 1 year	-	-	-		
Repro. perf.	Percent pregnant <sup>2</sup>	60	67	75		
	Calf survival percent <sup>3</sup>	88	91	89		
Wean. perf.	Adj. ADG <sup>4</sup>	1.46 <sup>(28)</sup>	1.60 <sup>(47)</sup>	1.42 <sup>(16)</sup>		
	Ave. type sc. <sup>5</sup>	10.5	10.4	10.1		
Postweaning performance	No. of bulls	18	20	12		
	No. of heifers	18	26	5		
	No. of steers	-	-	-		
Slaughtered	No. of bulls	12	14	6		
	No. of heifers	-	-	-		
	No. of steers	-	-	-		
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.



CLEMSON UNIVERSITY  
Agricultural Experiment Station  
Clemson, South Carolina

I. PROJECT: SC00102

Genotypic and Phenotypic response of crossbred cattle under different levels of management.

II. OBJECTIVES:

To evaluate the reproductive and lifetime performance of crossbred females under different environmental conditions.

III. PERSONNEL:

C. E. Thompson, J. R. Hill, Jr., S. G. Woods, G. C. Skelley, L. R. Allen, D. L. Cross and J. W. Hubbard.

IV. ACCOMPLISHMENTS DURING THE YEAR:

Replicate I: (Edisto Experiment Station)

Replicate I of the project involved five groups of 3-year-old cows of straightbred Angus, Polled Hereford-Angus, Charolais-Angus, Holstein-Angus and Simmental-Angus breeding. Of the 142 young cows, approximately one-half were on a moderate (Mod) level of nutritional and the other one-half on a high level of nutrition. (The major difference in the two levels was the high group had access to Yuchi Arrowleaf Clover Bermuda during the breeding season).

For the second consecutive year, two groups responded quite differently to the level of nutrition, particularly regarding certain genotypes. All of the dams had produced calves sired by Santa Gertrudis bulls and were heat checked for 45 days and bred A. I., then exposed to Angus, Charolais-Angus, Polled Hereford-Angus, Holstein-Angus and Simmental-Angus were 89%, 75%, 82%, 70%, and 50%, respectively, on the high level. The pregnancy rates were 78%, 44%, 88%, 57%, and 80% for the same breeds on the moderate level.

Replicate II. (Simpson Experiment Station)

Two groups of Charolais-Angus, Polled Hereford-Angus and Simmental-Angus 2-year-old cows were allotted to moderate or high treatment levels. Both levels were wintered to gain at a similar rate. Tillman Ladino Clover was the main clover in the fescue-clover grazing. Pregnancy rates were higher on the clover-fescue groups with the Simmental-Angus, Charolais-Angus and Polled Hereford-Angus averaging 81%, 85%, and 63%, respectively. Pregnancy rates on the Moderate level were 71%, 52%, and 50%, respectively. The Red Poll sired calves for the High level averaged 162, 180, and 189 kg for the Polled Hereford-Angus, Charolais-Angus and Simmental-Angus dams. Weights of 125, 156, and 155 kg were reported for the respective genotypes in the Moderate level.



V. FUTURE PLANS:

The project will continue as outlined.

VI. PUBLICATIONS:

Comerford, J. W., C. E. Thompson, P. M. Burrows and J. E. Gotti. "The Effects of Breed and Milk Production of the Dam on Preweaning Traits of Beef Calves". 1978. American Society of Animal Science Southern Section, Abstr. No. 35, Houston, Texas.

Comerford, J. W., C. E. Thompson, P. M. Burrows, J. R. Hill, Jr. and J. E. Gotti. "Effects of Breed and Milk Production of the Dam on Preweaning Traits of Beef Calves". 1978. Animal Science Research Series No. 34, Clemson, S.C.

Comerford, J. E., C. E. Thompson, G. C. Skelley and C. R. Sligh. "The Use of the Scanoprobe 731 in the Evaluation of Live Steers". 1978. Animal Science Research Series No. 34, Clemson, S. C.

Cross, D. L., J. M. Gubas, G. C. Skelley, J. R. Hill, Jr., and C. E. Thompson. "Feedlot Performance of Crossbred Steers". 1978. American Society of Animal Science Southern Section, Abstr. No. 28, Houston, Texas.

Cross, D. L., J. M. Gubas, G. C. Skelley, J. R. Hill, Jr. and C. E. Thompson. "Feedlot Performance of Crossbred Steers". 1978. Animal Science Research Series No. 34, Clemson, S. C.

Cross, D. L., G. C. Skelley, J. R. Hill, Jr. and C. E. Thompson. "Effect of Promotants on Performance of Crossbred Steers Receiving Rumensin". 1978. Animal Science Research Series No. 34, Clemson, S. C.

Gotti, J. E., C. E. Thompson and J. W. Comerford. "Preweaning Traits of Angus, Polled Hereford, Charolais and Simmental Sired Calves". 1978. American Society of Animal Science Southern Section, Abstr. No. 19, Houston, Texas.

Gotti, J. E., C. E. Thompson, A. R. Ellicott, J. R. Hill, Jr. and J. W. Comerford. "Clitoral Massage in Beef Cattle Prior to Artificial Insemination". 1978. Animal Science Research Series No. 34, Clemson, S. C.

Gotti, J. E., C. E. Thompson, A. R. Ellicott, J. R. Hill, Jr. and J. W. Comerford. "Thawing Bovine Semen Stored in Plastic Straws". 1978. Animal Science Research Series No. 34, Clemson, S. C.

Gotti, J. E., C. E. Thompson, A. R. Ellicott, J. R. Hill, Jr. and J. W. Comerford. "The Effect of Thaw Methods on Fertility of Bovine Semen". 1978. American Society of Animal Science Southern Section, Abstr. No. 34, Houston, Texas.

Skelley, G. C., J. R. Hill, Jr., C. E. Thompson, F. M. Terlizzi and C. R. Sligh. "Quality and Yield Grades of Steers Produced from Extensive Crossbreeding over Several Years". 1978. Animal Science Research Series No. 34, Clemson, S. C.

Skelley, G. C., C. R. Sligh, F. M. Terlizzi, C. E. Thompson, J. R. Hill, Jr., D. L. Cross and A. R. Ellicott. "Beef Carcass Characteristics of Crossbred Steers Fed on High Forage Rations". 1978. American Society of Animal Science Southern Section, Abstr. No. 29, Houston, Texas.

Skelley, G. C., C. E. Thompson, J. R. Hill, Jr., D. L. Cross, A. R. Ellicott, C. R. Sligh and F. M. Terlizzi. "Characteristics of Beef From Crossbred Animals Fed on High Forage Diets". 1978. Animal Science Research Series No. 34, Clemson, S. C.

Thompson, C. E., L. R. Allen, J. R. Hill, Jr., J. W. Comerford and J. E. Gotti. "Growth and Reproductive Performance of F<sub>1</sub> Heifers on Fescue Coastal Bermuda and Fescue-Clover Pastures". 1978. Animal Science Research Series No. 34, Clemson, S. C.

Thompson, C. E., L. R. Allen, S. G. Woods, J. E. Gotti, J. W. Comerford, J. R. Hill, Jr. and A. R. Ellicott. "Reproductive Performance of Two-Year-Old Beef Cows on Differing Forages". 1978. Animal Science Research Series No. 34, Clemson, S. C.

Thompson, C. E., J. W. Comerford, J. E. Gotti, S. G. Woods and J. R. Hill, Jr. "Birth and Preweaning Traits of Angus and F<sub>1</sub> Angus Crossbred Two-Year-Old Dams". 1978. American Society of Animal Science, Abstr. No. 84, East Lansing, Michigan.

Thompson, C. E., J. R. Hill, Jr., G. C. Skelley, D. L. Cross and A. R. Ellicott. "Preweaning Performance of Adjusted 205-Day Calf Weights by B. I. F. Recommendations". 1978. Animal Science Research Series No. 34, Clemson, S. C.

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Thompson, C. E., S. G. Woods, L. R. Allen, J. R. Hill, Jr., J. W. Comerford and J. E. Gotti. "Performance of Red Poll-Sired Calves by Angus and F<sub>1</sub> Angus Crossbred Dams". 1978. Animal Science Research Series No. 34, Clemson, S. C.

## VII. COOPERATORS:

Department of Animal Science, Clemson, S. C.

Edisto Experiment Station, Blackville, S. C.

Coast Experiment Station, Summerville, S. C.

Department of Agronomy and Soils, Clemson, S. C.

Department of Agricultural Economics and Rural Sociology, Clemson, S. C.



Funds Expended on Beef Cattle Breeding Work in S-10 Herds  
During the Year Ending December 31, 1978

State South Carolina

Source	Amount Spent for Permanent Non-recurring Items	Amount Spent for Operating Expenses
Regional Research Funds	None	\$4,909.19*
USDA funds from ARS	None	None
State-controlled funds <sup>1</sup>	None	\$110,458.98

<sup>1</sup>Include all federal-grant funds, state appropriations, and receipts, if your station spends receipts, in addition to appropriated funds.

Income from the sale of cattle during the year 1978 (include total sales, whether spent on the project or not).

\$150,020.96

Regional Research Fund Allotment for year 1978-79

\$44,211.46

\*Does not include wages and salaries.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State South Carolina

Location		Edisto	Experiment	Station, Blackville, S. C.	
Breed of sire		Santa Gertrudis	Santa Gertrudis	Santa Gertrudis	Santa Gertrudis
Breed of dam		Charolais x Angus	Hereford x Angus	Simmental x Angus	Holstein x Angus
Line or group <sup>1</sup>		Moderate Level	Moderate Level	Moderate Level	Moderate Level
Percent used in project		100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	4	15	8	7
	Yearling heifers				
	Bulls and steers under 1 year	5	7	4	2
	Heifers under 1 year	3	9	5	3
	Bulls over 1 year				
	Steers over 1 year				
Repro. perf.	Percent pregnant <sup>2</sup>	44	88	80	78
	Calf survival percent <sup>3</sup>	100	94	90	56
Wean. perf.	Adj. ADG <sup>4</sup>	1.07	1.00	1.13	1.08
	Ave. type sc. <sup>5</sup>	11	11	12	12
Postweaning performance	No. of bulls	0	0	0	0
	No. of heifers	5	9	5	3
	No. of steers	3	7	4	2
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:

Adjusted for Age and Sex.

<sup>5</sup>Suggest S-10 scoring system; indicate if different.

State South Carolina

Location		Edisto	Experiment	Station, Blackville, S. C.	
Breed of sire		Santa Gertrudis	Santa Gertrudis	Santa Gertrudis	Santa Gertrudis
Breed of dam		Charolais x Angus	Hereford x Angus	Simmental x Angus	Angus x Angus
Line or group <sup>1</sup>		High Level	High Level	High Level	High Level
Percent used in project		100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	9	14	6	8
	Yearling heifers				
	Bulls and steers under 1 year	7	8	9	4
	Heifers under 1 year	6	7	3	5
	Bulls over 1 year				
	Steers over 1 year				
Repro. perf.	Percent pregnant <sup>2</sup>	75	82	50	89
	Calf survival percent <sup>3</sup>	93	83	100	90
Wean. perf.	Adj. ADG <sup>4</sup>	1.21	1.15	1.28	1.12
	Ave. type sc. <sup>5</sup>	12	12	12	12
Postweaning performance	No. of bulls	0	0	0	0
	No. of heifers	6	7	3	5
	No. of steers	7	8	9	4
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:

Adjusted for Age and Sex.

<sup>5</sup>Suggest S-10 scoring system; indicate if different.



State South Carolina

Location		Simpson Station, Clemson, S. C.			
Breed of sire		Red Poll	Red Poll	Red Poll	
Breed of dam		Charolais x Angus	Hereford x Angus	Simmental x Angus	
Line or group <sup>1</sup>		Replacement Heifer	Replacement Heifer	Replacement Heifer	
Percent used in project		100	100	100	
Inventory as of December 31, 1978	Cows 2 years and over				
	Yearling heifers	6	6	12	
	Bulls and steers under 1 year				
	Heifers under 1 year				
	Bulls over 1 year				
	Steers over 1 year				
Repro. perf.	Percent <sup>2</sup> pregnant	100	100	100	
	Calf survival percent <sup>3</sup>				
Wean. perf.	Adj. ADG <sup>4</sup>				
	Ave. type sc. <sup>5</sup>				
Postweaning performance	No. of bulls				
	No. of heifers				
	No. of steers				
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.



State South Carolina

Location		Simpson Station, Clemson, S. C.			
Breed of sire		Charolais	Simmental	Angus	
Breed of dam		Angus	Angus	Angus	
Line or group <sup>1</sup>					
Percent used in project		100	100	100	
Inventory as of December 31, 1978	Cows 2 years and over	14	10	0	
	Yearling heifers				
	Bulls and steers under 1 year	9	8	0	
	Heifers under 1 year	7	3	0	
	Bulls over 1 year		13		
	Steers over 1 year				
Repro. perf.	Percent pregnant <sup>2</sup>	87.5	100	0	
	Calf survival percent <sup>3</sup>	94.1	73.3 <sup>1</sup>	0	
Wean. perf.	Adj. ADG <sup>4</sup>	1.07	1.09	--	
	Ave. type sc. <sup>5</sup>	12	12	--	
Postweaning performance	No. of bulls	0	8	0	
	No. of heifers	7	3	0	
	No. of steers	9	0	0	
Slaughtered	No. of bulls	0	0	0	
	No. of heifers	0	0	0	
	No. of steers	0	0	0	
Remarks					

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:  
Adjusted for Age and Sex.<sup>5</sup>Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1978

State South Carolina

Location		Simpson Station, Clemson, S. C.			
Breed of sire		Red Poll	Red Poll	Red Poll	
Breed of dam		Charolais x Angus	Hereford x Angus	Simmental x Angus	
Line or group <sup>1</sup>		Moderate Level	Moderate Level	Moderate Level	
Percent used in project		100	100	100	
Inventory as of December 31, 1978	Cows 2 years and over	26	23	23	
	Yearling heifers				
	Bulls and steers under 1 year	9	5	5	
	Heifers under 1 year	11	13	11	
	Bulls over 1 year	0	0	0	
	Steers over 1 year	0	0	0	
Repro. perf.	Percent <sup>2</sup> pregnant	50	51	71	
	Calf survival percent <sup>3</sup>	74	78	67	
Wean. perf.	Adj. ADG <sup>4</sup>	0.76	0.60	0.76	
	Ave. type sc. <sup>5</sup>	12	10	12	
Postweaning performance	No. of bulls	0	0	0	
	No. of heifers	11	13	11	
	No. of steers	9	5	5	
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

Adjusted for Sex and Age.

<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State South Carolina

Location		Simpson Station, Clemson, S. C.			
Breed of sire		Red Poll	Red Poll	Red Poll	
Breed of dam		Charolais x Angus	Hereford x Angus	Simmental x Angus	
Line or group <sup>1</sup>		High Level	High Level	High Level	
Percent used in project		100	100	100	
Inventory as of December 31, 1978	Cows 2 years and over	24	24	20	
	Yearling heifers				
	Bulls and steers under 1 year	8	8	6	
	Heifers under 1 year	9	11	5	
	Bulls over 1 year	0	0	0	
	Steers over 1 year	0	0	0	
Repro. perf.	Percent <sup>2</sup> pregnant	87	63	85	
	Calf survival percent <sup>3</sup>	68	73	52	
Wean. perf.	Adj. ADG <sup>4</sup>	0.79	0.79	0.92	
	Ave. type sc. <sup>5</sup>	12	11	13	
Postweaning performance	No. of bulls	0	0	0	
	No. of heifers	9	11	5	
	No. of steers	8	8	6	
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				

## Remarks

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:

Adjusted for Sex and Age.

<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State South Carolina

Location		Coast	Experiment	Station, Summerville, S. C.	
Breed of sire		Charolais	Hereford	Simmental	Angus
Breed of dam		Angus	Angus	Angus	Angus
Line or group <sup>1</sup>					
Percent used in project		100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	41	30	14	15
	Yearling heifers				
	Bulls and steers under 1 year	25	13	8	5
	Heifers under 1 year	30	21	8	11
	Bulls over 1 year				
	Steers over 1 year				
Repro. perf.	Percent pregnant <sup>2</sup>	72	86	82	94
	Calf survival percent <sup>3</sup>	93	97	89	94
Wean. perf.	Adj. ADG <sup>4</sup>	1.05	1.04	1.04	0.91
	Ave. type sc. <sup>5</sup>	12	11	13	10
Postweaning performance	No. of bulls	0	0	6	0
	No. of heifers	30	21	8	11
	No. of steers	25	13	2	5
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:

Adjusted for Sex and Age.

<sup>5</sup>Suggest S-10 scoring system; indicate if different.

Introduction

Conclusion

1. The first part of the paper discusses the importance of the study.		2. The second part of the paper discusses the methodology used.	
3. The third part of the paper discusses the results of the study.		4. The fourth part of the paper discusses the conclusions.	
5. The fifth part of the paper discusses the implications of the study.		6. The sixth part of the paper discusses the limitations of the study.	
7. The seventh part of the paper discusses the future research.		8. The eighth part of the paper discusses the acknowledgments.	
9. The ninth part of the paper discusses the references.		10. The tenth part of the paper discusses the appendix.	
11. The eleventh part of the paper discusses the bibliography.		12. The twelfth part of the paper discusses the index.	
13. The thirteenth part of the paper discusses the glossary.		14. The fourteenth part of the paper discusses the list of figures.	
15. The fifteenth part of the paper discusses the list of tables.		16. The sixteenth part of the paper discusses the list of equations.	
17. The seventeenth part of the paper discusses the list of symbols.		18. The eighteenth part of the paper discusses the list of abbreviations.	
19. The nineteenth part of the paper discusses the list of acronyms.		20. The twentieth part of the paper discusses the list of initialisms.	
21. The twenty-first part of the paper discusses the list of contractions.		22. The twenty-second part of the paper discusses the list of colloquialisms.	
23. The twenty-third part of the paper discusses the list of idioms.		24. The twenty-fourth part of the paper discusses the list of proverbs.	
25. The twenty-fifth part of the paper discusses the list of sayings.		26. The twenty-sixth part of the paper discusses the list of maxims.	
27. The twenty-seventh part of the paper discusses the list of aphorisms.		28. The twenty-eighth part of the paper discusses the list of epigrams.	
29. The twenty-ninth part of the paper discusses the list of epigrams.		30. The thirtieth part of the paper discusses the list of epigrams.	
31. The thirty-first part of the paper discusses the list of epigrams.		32. The thirty-second part of the paper discusses the list of epigrams.	
33. The thirty-third part of the paper discusses the list of epigrams.		34. The thirty-fourth part of the paper discusses the list of epigrams.	
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39. The thirty-ninth part of the paper discusses the list of epigrams.		40. The fortieth part of the paper discusses the list of epigrams.	
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49. The forty-ninth part of the paper discusses the list of epigrams.		50. The fiftieth part of the paper discusses the list of epigrams.	

UNIVERSITY OF TENNESSEE  
Agricultural Experiment Station  
Knoxville, Tennessee

I. PROJECT: H-481 (S-10)

Effects of selection to improve growth rate in beef cattle.

II. OBJECTIVES:

To measure the effectiveness of selection to improve growth rate to a year of age and the effects such selection will have on other traits.

To investigate phenotypic and genetic relationship between growth rate and other variables.

To investigate various methods of improving the accuracy of assessment of growth rate.

To study inbred beef cattle with the aid of immunogenetic markers.

III. PERSONNEL:

R. R. Shrode, R. D. Freeland, D. D. Howard, W. T. Butts, Jr.

IV. ACCOMPLISHMENTS DURING THE YEAR:

The brucellosis eradication program was continued in the Angus herd. All groups of cows maintained together in pastures during the 1978 breeding and grazing season are still being maintained in the same groups which are isolated from one another. One monthly test (November, 1978) brought to light no reactors to the brucellosis test, but the December and January tests have detected one reactor each from the same group of cows. Officials of the Animal and Plant Health Inspection Service consider the prospect of successful eradication in the near future to be excellent. The group of 16 retained orphaned 1977 daughters of reacting cows are now being tested monthly and no reactors have yet been discovered among them, indicating that they probably were not prenatally infected while carried by their dams. Much of the "mortality" reflected in the inventory is actually due to deliberate disposals dictated by the brucellosis eradication program.

Body temperature, respiration rate, pulse rate and visual behavior score of 98 Polled Herefords and 92 Angus at weaning and at one year of age before and after restraint in a squeeze were analyzed to evaluate psychological and/or physiological stress from such treatment and found not to be useful indicators of such stress or to have any appreciable or to have any appreciable or consistent correlation with production variables.

Analysis of six linear body measurements (heart girth, body length, hip height, hip width, chest depth, and shoulder width), body weight and seven variables calculated from these (body volume, ratio of weight to heart girth, ratio of weight to product of heart girth and length, ratio



of weight to hip height, ratio of weight to volume, ratio of weight to length and ratio of volume to height) taken from 1,325 Angus and 615 Polled Herefords at weaning and at one year of age showed three weaning body measurement variables, viz., ratio of body volume to hip height (named S-ratio, S for shape), body volume and heart girth, to have predictive values for predicting yearling weight of approximately 92%, 91% and 89% relative to the predictive value of weaning weight for predicting yearling weight. Since these three variables are nearly as highly correlated with yearling weight as is weaning weight (the correlation between weaning weight and yearling weight, being a part-whole correlation and expected to be large on mathematical grounds), these three variables may be quite useful in evaluating beef calves at weaning for selection purposes, even eliminating the necessity of recording body weights which frequently are not even available in small-scale beef production operations. The error in unshrunk live weights due to differences in fill, although random, is much larger than the random error in body measurements. The rank correlations between these three promising weaning variables and yearling weights are only slightly smaller than that between weaning weight and yearling weight, making it seem likely that a ranking of animals with respect to them at weaning would approximate closely a ranking of those animals with respect to true body mass at a year of age. While S-ratio has no statistical advantage over volume and heart girth, it may be preferred to them as a single numerical evaluation variable since it does permit shape and proportion to be reflected in the evaluation. (Tables 1 and 2)

The effectiveness of three procedures in protecting cattle against face flies and horn flies and in reducing the incidence of eye infections (pink eye) was evaluated during the 1978 grazing season. The Angus herd was maintained in twelve pasture groups. Three pastures were assigned to each of four treatments: (1) no fly protection (control), (2) standard procedure, consisting of provision of face dust bags, back rubbers and occasional spraying as dictated by the fly population (3) attachment of rabon-impregnated tags to cows' ears and (4) attachment of tags impregnated with benzenecetic acid, 4-chloro-alpha-(1-methyl ethyl cyano (3-phenoxy phenyl) methyl ester (Shell Development experimental tag no SD43775) to cows' ears. Counts of face flies and horn flies observed on the cattle on 19 different days at approximately weekly intervals 2 May, 1978, through 3 October, 1978, were recorded. Clinical cases of eye infection (pink eye) also were observed, recorded and treated. There were no significant differences among the three fly-protection procedure mean fly counts, but the difference between them and control mean fly count was significant ( $P < 0.01$ ). (Tables 3 and 4). Only six clinical cases of pink eye were observed among cattle provided fly protection as compared to 42 cases in the pastures in which no fly protection was provided, which seems to confirm the widely held opinion that flies play a significant role in the spread of eye infection.

#### V. FUTURE PLANS:

Continuation of analysis of body measurement variables with special emphasis on estimation of genetic parameters.

Continuation of the brucellosis eradication program in the Angus herd.

Prepare publications on completed analyses.

VI. PUBLICATIONS DURING THE YEAR:

Dellmeier, G. R. 1978. Utility of various variables recorded from weanling beef calves for predicting yearling variables. M. S. Thesis, University of Tennessee, Knoxville.

Light, G. S. 1978. Responses of beef calves to handling and restraint in a squeeze chute. M. S. Thesis, University of Tennessee, Knoxville.

TABLE 1. Coefficients of Correlation (Product-Moment) of Weaning Weight, Weaning S Ratio, Weaning Volume and Weaning Heart Girth with Yearling Weight

<u>Weaning Variable</u>	<u>r</u>
Weight	0.87
S-Ratio <sup>1</sup>	0.80
Volume <sup>2</sup>	0.79
Heart Girth	0.76

Relative Predictive Values

Weaning Weight	1.0000
S-Ratio	0.9159
Volume	0.9069
Heart Girth	0.8910

$$^1\text{S-Ratio} = \frac{\text{Volume}}{\text{Hip Height}}$$

$$^2\text{Volume} = \frac{(\text{Heart Girth})^2}{4(3.14)} \times \text{Length}$$

TABLE 2. Coefficients of Rank Correlation of Weaning Weight, Weaning S Ratio, Weaning Volume and Weaning Heart Girth with Yearling Weight

<u>Weaning Variable</u>	<u>r</u>
Weight	0.83
S-Ratio	0.75
Volume	0.74
Heart Girth	0.73



TABLE 3. Treatment Mean Numbers of Flies Observed on Nineteen Days of Observation 2 May, 1978 through 3 October, 1978

Face Flies

<u>Ear Tags</u>							
<u>Rabon</u>		<u>SD43775</u>		<u>Standard</u>		<u>Control</u>	
<u>Cows</u>	<u>Calves</u>	<u>Cows</u>	<u>Calves</u>	<u>Cows</u>	<u>Calves</u>	<u>Cows</u>	<u>Calves</u>
7.63	6.09	6.86	5.77	8.43	6.81	13.41	12.83

Horn Flies

<u>Ear Tags</u>							
<u>Rabon</u>		<u>SD43775</u>		<u>Standard</u>		<u>Control</u>	
<u>Cows</u>	<u>Calves</u>	<u>Cows</u>	<u>Calves</u>	<u>Cows</u>	<u>Calves</u>	<u>Cows</u>	<u>Calves</u>
0.97	0.80	0.62	0.25	3.21	1.40	51.45	22.38

TABLE 4. Analyses of Variance

<u>Cows (Face Flies)</u>			
<u>Source of Variation</u>	<u>D.F.</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>
Total	75	2,355.4455	
Treatments	3	589.6178	196.5393**
Control vs treated	1	565.9606	565.9606**
Standard vs tags	1	18.3142	18.3142
Rabon vs SD43775	1	5.3429	5.3429
Error	72	1,765.8277	24.5254
<u>Calves (Face Flies)</u>			
<u>Source of Variation</u>	<u>D.F.</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>
Total	75	2,890.3596	
Treatments	3	632.3432	210.7811**
Control vs treated	1	621.7534	621.7534**
Standard vs tags	1	9.6106	9.6106
Rabon vs SD43775	1	0.9792	0.9792
Error	72	2,258.0164	31.3613
<u>Cows (Horn Flies)</u>			
<u>Source of Variation</u>	<u>D.F.</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>
Total	75	68,486.1121	
Treatments	3	35,490.6794	11,830.2265**
Control vs treated	1	35,416.0573	35,416.0573**
Standard vs tags	1	73.4408	73.4408
Rabon vs SD43775	1	1.1813	1.1813
Error	72	32,996.4327	458.2838
<u>Calves (Horn Flies)</u>			
<u>Source of Variation</u>	<u>D.F.</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>
Total	75	15,794.5521	
Treatments	3	6,639.9544	2,213.3181**
Control vs treated	1	6,627.3288	6,627.3283**
Standard vs tags	1	9.6688	9.6688
Rabon vs SD43775	1	2.9569	2.9569
Error	72	9,154.5977	127.1472

\*\*p<0.01

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Tennessee

Location		PES	PES	PES	TES	TES
Breed of sire		Angus	Angus	Angus	P. Hereford	P. Hereford
Breed of dam		Angus	Angus	Angus	P. Hereford	P. Hereford
Line or group <sup>1</sup>		Inred	Select	Control	Select	Control
Percent used in project		100%	100%	100%	100%	100%
Inventory as of December 31, 1978	Cows 2 years and over	51	78	58	56	60
	Yearling heifers	11	13	10	23	22
	Bulls and steers under 1 year	30	50	20	24	29
	Heifers under 1 year	16	21	17	28	25
	Bulls over 1 year	0	0	0	0	0
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant <sup>2</sup>	92.0	97.2	84.4	86.7	87.1
	Calf survival percent <sup>3</sup>	50.0	60.0	73.7	92.3	74.1
Wean. perf.	Adj. ADG <sup>4</sup>	1.48	1.65	1.63	1.45	1.49
	Ave. type sc. <sup>5</sup>	12.6	12.8	12.8	12.7	13.3
Postweaning performance	No. of bulls	12	15	14	23	26
	No. of heifers	11	13	10	23	22
	No. of steers	0	0	0	0	0
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	0	0	0	0	0
Remarks						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments: Adjusted for age of dam and sex of calf to 205 day wt.<sup>5</sup>Suggest S-10 scoring system; indicate if different.





TEXAS AGRICULTURAL EXPERIMENT STATION  
College Station, Texas

I. PROJECT: H-2101

"Breeding Methods For Beef Cattle in The Southern Region"

II. PERSONNEL:

T. C. Cartwright, C. R. Long, J. Caldwell, D. F. Weseli and N. M. Kieffer

III. PURPOSE:

Project H-2101 presently serves a coordinating role for all Texas Agricultural Experiment Station Projects which contribute to Regional Project S-10. Specific accomplishments, results and plans are presented by specific contributing project.





TEXAS  
AGRICULTURAL EXPERIMENT STATION  
College Station, Texas

I. PROJECT: H-1936

Evaluation of hybrid systems for total efficiency of beef production

II. OBJECTIVES:

1. Evaluation of hybrid vigor for traits of major economic value.
  - a. Female traits (breeding cattle)
    - (1) Growth and maintenance requirements evaluated under pasture and drylot conditions
    - (2) Annual lifetime fertility, including age at puberty, services to conception and calving intervals
    - (3) Incidence of dystocia
    - (4) Productive longevity
    - (5) Maternal ability, milk yield
  - b. Male traits (slaughter cattle)
    - (1) Rate and efficiency of growth prior to optimal slaughter weight
    - (2) Survivability and vigor
    - (3) Carcass merit
2. Comparison of breeds and crosses, including dairy breeds, for their potential as "dam lines" for beef production. Dam-line breeds and crosses among these breeds will be Angus, Brahman, Hereford, Holstein and Jersey.
3. Evaluation of loss in hybrid vigor associated with the decreased heterozygosity and recombination losses due to inter se matings of  $F_1$  hybrids as practiced in new breed development.
4. Production of experimental cattle with the required degree of controlled genetic variability for efficacious auxiliary intensive investigations:
  - a. Evaluation of growth curves for body composition using serial slaughter techniques
  - b. Evaluation of partial efficiencies of growth, maintenance and lactation
  - c. Development of management systems specifically applicable to optimal utilization of sire and dam line breeding programs; for example, nutritional programs to reduce dystocia and to promote early postparturient conception

III. PERSONNEL:

C. R. Long (leader) and T. C. Cartwright

#### IV. ACCOMPLISHMENTS DURING THE YEAR:

Knowledge of relationships among growth, puberty, reproduction and other characters of cattle is necessary for designing efficient beef production systems. Data on bulls (groups and individually fed) and heifers (pastured and individually fed) of a diallel involving Angus, Brahman, Hereford, Holstein and Jersey (reciprocals pooled) showed that mature height was approached more rapidly than mature weight. Breedtype and management (pasture vs individual feeding) were found to significantly affect weight, height and condition score at most ages as well as growth rate. The breedtype x management interaction was significant for weight, weight-height ratio and condition score of heifers at most ages. Heterosis was observed for weight (7 to 14%) and height (2 to 4%) in bulls and heifers. Management affected level of heterosis is observed in heifers. Results suggest that heterosis in younger animals may be partially due to accelerated development potential in crossbreds; higher nutrition under individual feeding apparently provided the requirement for the expression of this potential in the heifers.

Breedtype differences were observed for age, weight and height at puberty of bulls and heifers; heterosis for weight and height at puberty was positive while differences between straightbreds and crossbreds for age at puberty ranged from -3.6 to +3.7% across sex-management categories.

Preliminary analyses of records of cows producing first and second inter se calves revealed average heterosis estimates for age at first parturition (-5.4%), postpartum interval (-4.6%), calving interval (-.5%), calves born alive (9.0%), calves weaned of calves born (11.3%), parturition weight (5.8%) and parturition height (2.4%). Crossbreds were younger at first parturition, exhibited shorter postpartum and calving intervals and produced calves with higher survival rates at birth and to weaning.

#### V. FUTURE PLANS:

Project H-1936 calf production will continue as outlined in the proposal. Data collection procedures will continue as described in earlier reports.

Almost all first generation cows (90%) have produced three inter se calves and are being mated by natural service to Charolais and Red Poll sires. Second generation females continue to produce  $F_3$  and straightbred calves.

Data analyses which are scheduled for completion during the coming year include data on first generation cows in confinement as well as first generation calving and weaning data on at least the first 2 calves. Third breed cross and third generation calves will be produced in increasing numbers and will be available to other researchers and locations for research.

Some reductions and alterations have been made in design and data collection to reduce costs of the project; however, the primary objectives remain intact.

VI. PUBLICATIONS DURING THE YEAR:

Baker, J. F., C. R. Long and T. C. Cartwright. 1978. Measures of fatness in heifers of a five-breed diallel. ASAS 1978 Southern Section Abstracts:15 (abstr.).

Long, C. R. 1978. Design and results of a research program to quantify heterosis and character relationships for beef production systems. In Proceedings and Seminar and Heterosis and Beef Cattle Production Systems at Balcarce, Argentina.

Long, C. R. and T. C. Cartwright, editors. 1978. Beef cattle field day report-1978. Research Center Technical Report No. 78-1, TAMU Agricultural Research Center at McGregor, Texas Agricultural Experiment Station.

Long, C. R., T. G. Jenkins, J. F. Baker and T. C. Cartwright. 1978. Breedtype-environment interaction for weight and condition score of heifers. ASAS 1978 Meeting Abstracts:238 (abstr.).



## I. PROJECT: G-6230

Biological Efficiency and Economic Viability of Forage Based Beef Cattle Production Systems

## II. PERSONNEL:

T. C. Cartwright, J. O. Sanders and C. R. Shumway

## III. ACCOMPLISHMENTS DURING THE YEAR:

A comprehensive, biological based mathematical model for simulating beef cattle production systems was completed and used to simulate alternative management, marketing and breeding systems. Simulations were conducted under cooperative systems research with U.S. Meat Animal Research Center to determine the effects on biologic and economic efficiency of milk level, breed size and crossbreeding systems for a specific sets of production conditions. Optimal milk level was found to be between levels giving maximum calf survival and levels that reduced rebreeding performance to the extent that weaning weight per cow exposed was reduced with the exact optimum dependent upon forage to grain price ratios. In purebred production systems or in crossing systems in which breeds of similar size were used, breed size had little effect on integrated efficiency but economic efficiency usually favored large cows because of fixed per head costs. Crossbreeding systems that utilized heterosis in both the cow and calf and complementarity by producing replacements from young cows and mating older cows to a large terminal sire breed were biologically and economically more efficient.

## IV. FUTURE PLANS:

Examination of extensive sets of alternative production systems simulations will be completed. These include cow-calf production on various combinations of native and improved warm season and annual cool season forages and suppletion including hay. Calving season, weaning age, breed, crossing system and other management variables will be examined. Also, selected ones of these alternatives will be extended to finish the sale calves on combinations of forage and concentrates.

## V. PUBLICATIONS DURING THE YEAR:

Notter, David R., J. O. Sanders, G. E. Dickerson, Gerald M. Smith and T. C. Cartwright. 1979. Simulated efficiency of beef production for a midwestern cow-calf-feedlot management system. I. Milk production. J. Anim. Sci. 48: (In Press).

Notter, David R., J. O. Sanders, G. E. Dickerson, Gerald M. Smith and T. C. Cartwright. 1979. Simulated efficiency of beef production for a midwestern cow-calf-feedlot management system. II. Mature body size. J. Anim. Sci. 48: (In Press).

Notter, David R., J. O. Sanders, G. E. Dickerson, Gerald M. Smith and T. C. Cartwright. 1979. Simulated efficiency of beef production for a midwestern cow-calf-feedlot management system. III. Crossbreeding systems. J. Anim. Sci. 48: (In Press).

Sanders, J. O. and T. C. Cartwright. 1979. A general cattle production systems model. I. Structure of the model. Agricultural Systems 4: (In Press).

Sanders, J. O. and T. C. Cartwright. 1979. A general cattle production systems model. II. Procedures used for simulating animal performance. Agricultural Systems 4: (In Press).





TEXAS AGRICULTURAL EXPERIMENT STATION  
College Station, Texas

## I. PROJECT: H-6268

Measurement of in vivo Genetic Developmental Response of Bovine Embryos To Endogenous Biochemical Stimuli

## II. OBJECTIVES:

1. To measure the influence of skeletal muscular development of cellular and cellular product exchange via the fused chorions of implanted doubled muscle and normal twin calves.
2. To measure the physiological effects of cellular chimerism in implanted genetically unrelated bovine twins.

## III. PERSONNEL:

Nat M. Kieffer (leader), Duane C. Kraemer and Jerry Caldwell

## IV. ACCOMPLISHMENTS DURING THE YEAR:

Two sets of twins were born in 1978. The first set (born 4-8-78) consisted of a homozygous doubled muscle male and a homozygous normal muscled female. A normal embryo (Hereford x Angus) was transferred to a homozygous doubled muscle cow which had been bred to a homozygous doubled muscle bull. Thus the doubled muscle cow was the biological mother of the doubled muscle calf and the foster mother of the normal calf, both calves having shared the uterus of the same cow at the same time during prenatal development. At the present time, the genetically doubled muscle calf shows typical phenotypic features of doubled muscling. The genotypically normal calf, however, shows many phenotypic features consistent with that of genotypic doubled muscle heterozygote. The most prominent of these features are thick muscling and the tendency for a "stretched" stance when standing at rest. In the near future muscle biopsies will be taken to determine muscle fiber types and the number of axons innervating the muscles.

The second set of twins was born 12-20-78 and consisted of a female (homozygous doubled muscled) and a male (homozygous normal muscled). Although both calves were lightly muscled at birth, the homozygous doubled muscled calf had unmistakable characteristics of double muscling: thick tongue which protruded outside the mouth, short tail with high setting and sloping rump. The homozygous normal calf was not remarkable at birth. The doubled muscled calf died from exposure on 1-2-79. Muscle biopsies were taken to determine fiber types and the number of axons innervating the muscles.

# Bovine Male Hybrid Sterility (Project S-1646; discontinued in 1977)

Somatic and meiotic chromosomes from a Bison bison x Bos taurus bull and a Bos banteng x Bos taurus bull were stained to demonstrate C- and G-bands and Nucleolus Organizer Regions. C-banded materials were located exclusively in the centromeric area of every autosome. Individual autosomes had varying amount C-band positive material. One homolog of pair No. 1 chromosomes had C- polymorphism. The X chromosome of both of these sterile bulls was submetacentric and apparently devoid of any darkly-stained C-band material. The Y chromosome of both bulls were C-band positive but did not stain as darkly as the autosomal C-banded material. For the G-banded material it was easy to identify homologs of the larger chromosomes but was rather difficult in the case of the smaller pairs. In every autosome the proximal segment of the long arm was unstained and devoid of any bands. This poorly stained segment appeared to be larger in areas compared to the C-band segment. A darkly-stained collar-like G-band was present in practically every autosome just below the unstained segment.

According to other reports, the maximum number of nucleolus organizer regions (NOR) is 10. In these data, out of 20 metaphase plates examined the number of NOR's varied from 5 to 10 with a mean of 6.95.

## V. FUTURE PLANS:

Animals will be available from the first back crosses in the Bovine Hybrid Sterility study. The hybrids will be of 1/4 Banteng and 3/5 domestic breeding. Testicular tissue will be examined histologically and cytologically for causes of sterility. The histologic and cytologic data will be compared with comparable data from 1/2 Banteng, 1/2 domestic and domestic cattle.

Additional embryo transfers will be made in the twin study and methods of evaluating the prenatal effects of genetically different twins on each other's postnatal developments will be explored.

## IV. PUBLICATIONS DURING THE YEAR:

Berardino, Dino Di, Frances E. Arrighi and Nat M. Kieffer. 1978. Nucleolus organizer regions in two species of bovidae. J. of Heredity (In Press).

Kieffer, Nat M. and G. M. Bowling. 1978. In Vitro leukocyte sex chromosome replication patterns of bovine chimeras. Symposium on Mammalian Cytogenetics, American Society of Animal Science, Michigan State University.

Pathak, S. and Nat M. Kieffer. 1978. Sterility in hybrid cattle. I. Distribution of constitutive heterochromatin and nucleolus organizer regions in somatic and meiotic chromosomes. Cytogenetics and Cell Genetics (In Press).

Stallings, R. L. and Nat M. Kieffer. 1978. Chromosome characterizations in a restricted population of Geomys bursarius (Rodentia: Geomyidae). Submitted to Cytologia.

Stallings, R. L. and Nat M. Kieffer. 1978. Meiotic studies in Geomys bursarius (Rodentia: Geomyidae). Mammalian Chromosome Newsletter (In Press).





TEXAS AGRICULTURAL EXPERIMENT STATION  
College Station, Texas

I. PROJECT: TEXO 6335

Immunogenetic analysis of the major histo-compatibility system in cattle.

II. OBJECTIVES:

1. Develop procedures to detect bovine lymphocyte antigens.
2. Determine the mode of inheritance of lymphocyte alloantigens.
3. Determine the relationship of specific lymphocyte antigens with the susceptibility or resistance to given diseases.
4. Determine the influence of histo-incompatibility on conception rate and embryonic mortality.

III. PERSONNEL:

Jerry Caldwell (Leader), D. F. Weseli, J. W. Templeton, J. D. Williams and L. G. Adams

IV. ACCOMPLISHMENTS DURING THE YEAR:

Previous to this reporting period 417 antisera were collected. Most of these have been screened for lymphocytotoxic activity. During this year an additional 383 antisera were obtained. These are now being tested for their usefulness in studying cattle lymphocyte antigens. During this period several hundred cattle of various breeds were tested. The first genetic locus with six alleles was discovered; this is a major step in defining the major histocompatibility complex in bovine. Also studies were begun to analyze the mixed lymphocyte reaction (MLR) locus. Animals from a private herd in Texas and from the Auburn University, Auburn, Alabama herd were used for this study. Although those results are not completely clear, their evaluation indicates that typing for the MLR locus may also be possible. Titrations and absorptions of the test antisera are continuing in an attempt to render them more monospecific and thus improve the tests.

V. PUBLICATIONS:

Caldwell, J., C. F. Bryan, P. A. Cumberland and D. F. Weseli. 1977. Serologically detected lymphocyte antigens in Holstein cattle. Anim. Blood Grps. biochem. Genet. 8:197-207.

Caldwell, J. and P. A. Cumberland. 1978. Cattle lymphocyte antigens. Trans. Proc. Vol. 10, No. 4:889-892.

Caldwell, J. Polymorphism of the BoLA system. Tissue Antigens. (In Press).

IV. FUTURE PLANS:

Research will continue on collecting antisera and testing families of cattle to determine the inheritance of lymphocyte antigens. As the opportunity becomes available animals will be studied which possess specific diseases. Work is planned to further study the MLR locus.

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		Angus	Brahman	Hereford	Holstein	Jersey
Breed of dam		Angus	Brahman	Hereford	Holstein	Jersey
Line or group <sup>1</sup>		Purebred	Purebred	Purebred	Purebred	Purebred
Percent used in project		100	100	100	100	100
Inventory as of December 31, 19 78	Cows 2 years and over	22G1 17G2	18G1 6G2	44G1 29G2	22G1 13G2	11G1 8G2
	Yearling heifers	8G2 1G3	8G2	17G2	8G2 2G3	4G2 1G3
	Bulls and steers under 1 year	5G2	1G2	4G2 1G3	3G2 3G3	3G2
	Heifers under 1 year	4G2 2G3	2G2	6G2	4G2 1G3	1G2
	Bulls over 1 year	4G2	5G2	5G2	5G2	4G2
	Steers over 1 year					
Repro. perf.	Percent pregnant <sup>2</sup>					
	Calf survival percent <sup>3</sup>					
Wean. perf.	Adj. ADG <sup>4</sup>					
	Ave. type sc. <sup>5</sup>					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks G1, G2 and G3 refer to 1st, 2nd and 3rd generations.						

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.



State Texas

Location	McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire	Angus	Angus	Angus	Angus	Brahman
Breed of dam	Brahman	Hereford	Holstein	Jersey	Hereford
Line or group <sup>1</sup>	F1-F2-F3	F1-F2-F3	F1-F2-F3	F1-F2-F3	F1-F2-F3
Percent used in project	100	100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	28F1 13F2	19F1 12F2	29F1 19F2	21F1 16F2
	Yearling heifers	10F2 3F3	8F2 2F3	6F2 5F3	5F2 3F3
	Bulls and steers under 1 year	2F2 1F3	4F2	2F2 4F3	3F2 2F3
	Heifers under 1 year	4F2 1F3	5F2	8F2 3F3	3F2 3F3
	Bulls over 1 year	5F2	6F2	6F2	6F2
	Steers over 1 year				
Repro. perf.	Percent pregnant <sup>2</sup>				
	Calf survival percent <sup>3</sup>				
Mean. perf.	Adj. ADG <sup>4</sup>				
	Ave. type sc. <sup>5</sup>				
Postweaning performance	No. of bulls				
	No. of heifers				
	No. of steers				
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

<sup>5</sup>Suggest S-10 scoring system; indicate if different.

State Texas

Location	McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire	Brahman	Brahman	Hereford	Hereford	Holstein
Breed of dam	Holstein	Jersey	Holstein	Jersey	Jersey
Line or group <sup>1</sup>	F1-F2-F3	F1-F2-F3	F1-F2-F3	F1-F2-F3	F1-F2-F3
Percent used in project	100	100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	23F1 7F2	26F1 19F2	30F1 22F2	42F1 34F2
	Yearling heifers	7F2 1F3	8F2	18F2 4F3	16F2 4F3
	Bulls and steers under 1 year	4F2	2F2 2F3	2F2 7F3	7F2 8F3
	Heifers under 1 year		3F2 2F3	7F2 4F3	6F2 7F3
	Bulls over 1 year	6F2	7F2	6F2	6F2
	Steers over 1 year				
Repro. perf.	Percent pregnant <sup>2</sup>				
	Calf survival percent <sup>3</sup>				
Wean. perf.	Adj. ADG <sup>4</sup>				
	Ave. type sc. <sup>5</sup>				
Postweaning performance	No. of bulls				
	No. of heifers				
	No. of steers				
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				

## Remarks

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.



VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY  
Agriculture Experiment Station  
Blacksburg, Virginia

I. PROJECT: State 2022120 (S-10)

Evaluating Sire and Dam Breeds in Crossbreeding Programs for Maximizing Beef Production.

II. OBJECTIVES:

To evaluate several cattle breeds as sire breeds when bred to Hereford and/or Angus cows (Phase I).

To compare the productivity of several kinds of crossbred cows with each other and with straightbred cows (Phase II).

To determine the best combination of breeds and mating schemes for maximizing beef production (Phase III).

III. PERSONNEL:

Thomas J. Marlowe and Thomas H. Bibb

IV. ACCOMPLISHMENTS DURING THE YEAR:

A. Scope and Nature of Work

This research is being conducted on five farms operated by the Virginia Department of Corrections at Beaumont, Bland, Hanover, State Farm and Southampton. Since details of the project and the results of Phase I (sire breed evaluation) have been reported earlier they will not be repeated here.

Phase II was divided into three cycles as follows:

Cycle 1 involved the mating of all heifers, either as yearlings or as two-year-olds, to Angus bulls (except for the straightbred controls) at each of the five locations and evaluation of each of the 13 kinds of females on their own reproductive performance; the growth performance of their progeny to birth, weaning, 12 months and 18 months; and their carcass characteristics at Bland and Southampton.

Cycle 2 involved all subsequent matings through the 1978 calf crop. The approximate number of phase II cows at each location and the breed of bulls used were reported in the 1976 annual report of S-10. Cow performance is being evaluated on fertility, calving ease and calf losses, pounds of calf weaned per cow exposed and/or per 100 pounds of cow exposed, postweaning gains to 12 and 18 months of age, conformation and carcass quality of their progeny at Bland and Southampton. Cows were weighed annually so that calf weights can be related to cow weights and cow winter maintenance cost.



Cycle 3 started with the 1978 breeding season. All kinds of cows, except the straightbred controls, at all locations were mated equally to Limousin x Shorthorn and Maine-Anjou x Shorthorn bulls. This will continue for a second calf crop. In addition to providing data to further evaluate the several kinds of cows, the data can be used to look at genetic x environmental interactions within these herds.

#### B. 1978 Research Results

Performance of Phase II cows and their progeny are shown in table 1 for the 1978 calf crop by location and kind of cow. These data demonstrate differences by kind of cow at each location. Perhaps the most significant measure of cow performance is the pounds of calf weaned per cow exposed since this value combined cow fertility and calf performance. These comparisons are shown in the extreme right hand column of table 1. By this measure crossbred cows in 1978 were superior to straightbred cows (whether bred to bulls of their own breed or another breed) at all locations. The average difference was 60 pounds per calf with a range from 44 to 134 pounds. Differences between the best performing crossbred group and the straightbred controls in 1978 ranged from 74 lb at Southampton to 143 lb at Bland or an average difference over all locations of 112 lb in favor of the best crossbred group over the straightbred controls. At three of the four locations where Holstein cross cows were compared, she weaned more pounds of calf per cow exposed than any other breed. She was beaten only by the Brown Swiss at the other locations.

Table 2 gives a comparison by kind of cow and progeny-crossbred (XB) cows with crossbred calves, straightbred cows (SB) with crossbred calves and straightbred cows with straightbred calves. At two locations (State Farm and Southampton) performance of the 4-way cross (synthetic) herds is also shown.

Postweaning performance to 12 and 18 months of age is shown in tables 3 and 5 for the 1977 calf crop by location, sex and kind of cow. Yearling weights are low on these cattle because they were fed on roughage only, except at Southampton where the steers received one percent of their body weight daily in a corn-SBOM supplement. Generally, both steers and heifers out of Holstein x cows were heavier at 12 and 18 months of age than all other groups. They were followed by cattle out of Charolais x, Simmental x and Shorthorn x cows. The straightbreds, with the exception of the Angus at Bland, had the lightest yearling weights at all locations. Table 4 shows more clearly the growth pattern of straightbreds, XB progeny out of SB cows and XB progeny out of XB cows to 12 months of age. Averaged over all locations, the postweaning ADG's for heifers were 0.96, 1.09 and 1.08 lb for the three groups, respectively. Corresponding adjusted 365-day weights were 520, 547 and 599 pounds. For steers, ADG's were 1.06, 1.21 and 1.14 and adjusted 365-day weights were 541, 597 and 630 pounds. Conformation grades also favored the XB progeny out of XB dams.

#### C. 1978 Cattle Inventory

The cattle inventories shown in tables 6-10 are the cows bred in 1977 for the 1978 calf crop and their progeny, except that the yearling cattle are those produced in the 1977 calf crop.

#### V. FUTURE PLANS:

As outlined briefly under IV A above, cycle 3 of Phase II started with the 1978 breeding season and will continue for two calf crops. All kinds of cows (except the SB controls) at all locations will be mated equally to Limousin x Shorthorn and Maine-Anjou x Shorthorn bulls.

Female offspring from the Phase II cows are being performance tested and the best straightbreds, single crosses, three-way crosses and 4-way crosses are being compared as foundation females under Phase III. Two 4-way cross herds have been established at Southampton and State Farm as a possibility for establishing a new breed.

#### IV. PUBLICATIONS DURING THE YEAR:

Marlowe, T. J. 1978. Rationale and need for data adjustment. Proceedings, BIF Research Symposium and Annual Meeting, May 22-24, 1978. Blacksburg. pp 4-7.

Marlowe, T. J. 1978. Preweaning, conditioning and stocker management. Chapter 6, The Feedlot. (Second Edition). Lea & Febiger, Philadelphia.

Marlowe, T. J. 1978. Weaning, preconditioning and selling calves. Chapter 13, Commercial Beef Cattle Production. (Second Edition). Lea & Febiger, Philadelphia.

Marlowe, T. J. and W. H. Whittle, Jr. 1978. Adjustment factor comparisons for crossbred and straightbred cows. 1977-78 Livestock Research Report, VPI&SU Res. Div. Rpt. 174. pp 70-75.

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Table 1  
Virginia Department of Corrections - 1978  
Phase II Cow and Calf Performance by Location and Kind of Cow

Sire breed	Cow Breed	Number of cows			Calf losses	Calves weaned				# Calf/ cow exp.	
		exp.	open	died		no.	%	205d wt	gr.		cond.
<u>Beaumont</u>											
SmA	CH	27	7	0	3	17	63.0	513	13.7	8.4	323
SmA	FH	27	3	0	2	22	82.5	508	13.7	8.5	419
SmA	ShH	29	1	0	2	27	93.1	444	13.0	8.0	413
SmA	HH	26	6	0	4	16	61.5	405	12.9	8.0	249
Her	HH	33	5	1	3	25	75.7	364	11.9	8.2	275
Combined		142	22	1	14	107	75.3	444	13.0	8.2	334
<u>Bland</u>											
Ang	AA	33	7	1	2	23	69.7	427	11.8	7.7	298
Ang	CH	42	14	2	2	24	57.1	496	13.5	8.0	283
Ang	CF	12	4	1	0	7	58.3	541	13.0	8.8	315
Ang	SH	43	13	0	6	24	55.8	481	13.0	7.5	268
Ang	HH	34	11	1	3	20	58.8	404	12.0	6.9	237
Her	HH	37	11	1	5	17	45.9	375	11.9	6.5	172
Sim	SmH	49	13	0	7	30	61.2	488	13.4	7.0	299
Combined		250	73	6	25	145	58.0	456	12.7	7.4	264
<u>Hanover</u>											
SmH	AH	34	6	0	4	25	73.5	368	11.3	6.3	270
SmH	BSH	39	6	2	2	30	76.9	363	11.4	6.0	279
SmH	CH	26	3	0	4	19	73.1	385	12.5	6.3	281
SmH	HH	28	5	0	5	18	64.3	348	11.7	6.0	224
Her	HH	23	5	2	3	13	56.5	312	10.8	5.9	176
Combined		150	25	4	18	105	70.0	359	11.5	6.1	251
<u>Southampton</u>											
Ang	AA	28	1	0	0	27	96.4	435	12.5	6.9	419
Char	Char	28	4	0	5	19	67.8	505	13.7	6.9	342
SmH	AA	26	1	1	2	23	88.5	442	13.0	7.1	391
SmH	CA	29	0	0	0	29	100.0	448	13.2	6.9	448
SmH	FA	31	1	0	3	27	87.1	519	13.3	7.2	454
4W	4W	30	1	0	3	26	86.7	497	13.0	7.4	431
Combined		172	8	1	13	151	87.8	473	13.1	7.1	415
<u>State Farm</u>											
Sh	AH	52	7	0	5	41	78.8	458	12.9	9.0	361
A, Sh	BSH	44	6	0	2	37	84.1	492	12.8	8.0	414
A, Sh	CH	50	8	0	3	39	78.0	472	13.3	7.9	368
A, Sh	FH	55	6	0	4	45	81.8	483	12.8	8.3	395
Ang	ShH	44	4	0	2	38	86.4	437	12.8	8.2	377
A, Sh	SmH	50	8	0	5	38	76.0	461	13.0	8.0	350
A, Sh	HH	59	8	0	3	48	81.3	433	12.8	8.0	352
Her	HH	54	5	1	4	44	81.5	387	11.8	8.1	315
4W	4W	21	0	1	2	18	85.7	456	12.7	7.9	391
Combined		429	52	2	30	348	81.1	452	12.7	8.2	366
<u>All Locations</u>											
All Breeds		1143	184	14	101	856	74.9	444	12.7	7.6	332



Table 2

Virginia Department of Corrections Herds - 1978  
Phase II Cow Breed Evaluation: Fertility, Calf Survival and Performance to Weaning  
by Location and Kind of Mating

Cow	Kind of Progeny	Cows exp	Open		Calf Losses		Weaned		Performance to weaning			# calf/ cow exp.
			No.	%	No.	%	No.	%	205d wt	Grade	Cond	
Beaumont												
XB	XB	83	11	13.2	7	9.6	66	79.5	488	13.4	8.3	392
SB	XB	26	6	23.1	4	20.0	16	61.5	405	12.9	8.0	249
SB	SB	33	5	15.1	3	10.7	25	75.7	364	11.9	8.2	275
Bland												
XB	XB	146	44	30.1	15	15.0	85	58.2	504	13.3	7.6	293
SB	XB	34	11	32.3	3	13.0	20	58.8	404	12.0	6.9	237
SB	SB	70	18	25.7	7	14.9	40	57.1	405	11.8	7.2	231
Hanover												
XB	XB	99	15	11.5	10	11.9	74	74.7	370	11.6	6.2	276
SB	XB	28	5	18.8	5	21.7	18	64.3	348	11.7	6.0	224
SB	SB	23	5	21.7	3	18.7	13	56.5	312	10.8	5.7	176
State Farm												
4W	4W	21	0	0.0	2	10.0	18	85.7	456	12.7	7.9	391
XB	XB	295	39	13.2	21	8.1	238	80.7	467	12.9	8.2	377
SB	XB	59	8	13.6	3	5.9	48	81.8	433	12.8	8.0	352
SB	SB	54	5	9.3	4	8.3	44	81.5	387	11.8	8.1	315
Southampton												
4W	4W	30	1	3.3	3	9.0	26	86.7	497	13.0	7.4	431
XB	XB	60	1	1.7	3	5.1	56	93.3	482	13.2	7.1	450
SB	XB	26	1	3.8	2	8.0	23	88.5	442	13.0	7.1	391
SB	SB	56	5	8.9	5	9.0	46	82.1	464	13.0	6.9	381
All Locations												
4W	4W	51	1	2.0	5	10.2	44	86.3	480	12.9	7.6	414
XB	XB	683	110	16.1	56	9.7	519	76.0	463	12.9	7.7	352
SB	XB	173	31	17.9	17	12.0	125	72.2	414	12.6	7.4	300
SB	SB	236	38	16.1	22	11.6	168	71.2	403	12.1	7.4	287

VIRGINIA DEPARTMENT OF CORRECTIONS  
 PHASE II COW BREED EVALUATION: POSTWEANING PERFORMANCE TO 12 MONTHS OF AGE  
 BY SEX AND KIND OF COW - 1977 CALF CROP

Sire breed	Cow breed	Heifers					Steers				
		No.	ADG	Wt.	Gr.	Cond.	No.	ADG	Wt.	Gr.	Cond.
Beaumont											
SmA	CH	9	1.66	721	13.3	8.2	9	1.05	642	13.1	6.6
SmA	FH	8	1.54	704	13.1	7.7	8	1.11	729	13.4	7.1
SmA	ShH	9	1.57	679	13.1	8.4	14	1.22	670	13.3	7.6
SmA	HH	8	1.43	626	12.9	7.7	8	1.24	588	11.6	7.2
Her	HH	9	1.21	515	12.3	7.9	10	0.92	510	11.7	7.1
Combined		43	1.48	648	12.9	7.9	49	1.11	629	12.7	7.2
Bland											
Ang	AA	9	0.90	532	11.7	7.4	12	0.97	567	12.4	7.3
Her	HH	11	0.78	439	10.2	5.8	9	0.94	471	12.3	6.7
Ang	CF	3	0.82	591	12.3	6.3	18	1.03	614	13.0	7.4
Ang	CH	12	0.90	576	13.1	6.9	5	0.90	568	12.2	6.4
Ang	SH	18	0.80	526	12.9	7.0	16	1.05	589	12.6	7.2
Ang	HH	9	0.91	468	11.8	6.1	12	1.04	525	12.4	7.0
Sim	% Sm	5	0.96	538	13.4	5.9	7	0.65	538	13.5	5.4
Combined		67	0.85	518	12.2	6.6	79	0.98	562	13.0	6.9
Hanover											
SmH	AH	5	0.88	499	11.2	7.0	17	0.94	549	11.7	8.5
A, SmH	BSH	14	0.80	519	11.7	6.6	5	0.92	563	11.4	6.4
A, SmH	CH	8	0.71	476	11.4	6.4	9	0.92	544	12.0	6.9
A, SmH	HH	7	0.73	433	10.7	6.7	9	0.99	509	11.1	7.3
Her	HH	6	0.73	475	11.7	7.8	9	0.88	572	11.8	7.2
Combined		40	0.77	486	11.4	6.8	49	0.93	547	11.6	7.5
Southampton											
Ang	AA	12	1.03	534	11.6	7.0	13	1.26	562	11.7	7.3
Char	CC	6	0.77	642	12.7	6.0	6	1.51	618	13.0	6.2
A, SmH	AA	10	0.86	596	12.5	6.3	14	1.47	733	12.9	7.6
A, SmH	CA	13	1.03	625	12.5	6.4	13	1.56	753	13.4	7.2
A, SmH	FA	14	0.89	652	12.6	6.5	14	1.58	823	13.8	7.2
4-W	4-W	7	1.04	694	13.4	6.9	8	1.57	798	13.0	7.4
Combined		62	0.95	618	12.4	6.5	68	1.40	721	13.0	7.2
State Farm											
A, Sh	AH	11	1.17	609	12.6	8.2	18	1.07	581	11.7	7.1
A, Sh	BSH	13	1.19	605	13.0	7.6	5	1.18	600	13.2	7.0
A, Sh	CH	13	1.20	603	12.8	8.1	16	1.19	596	12.2	7.1
A, Sh	FH	20	1.15	643	13.2	7.8	19	1.11	622	12.4	7.2
A, SmA	ShH	8	1.29	614	13.0	8.0	10	1.31	654	13.0	7.6
A, Sh	SH	11	1.13	616	13.4	7.7	14	1.26	637	13.4	7.4
A, Sh	HH	18	1.31	570	12.4	7.9	12	1.21	581	12.6	7.2
Her	HH	11	1.13	538	11.5	7.4	10	1.03	499	11.9	7.0
Combined		105	1.22	597	12.7	7.8	104	1.16	598	12.4	7.2

Table 4  
Virginia Department of Corrections Herds  
Phase II Cow Breed Evaluation: Postweaning to 12 Months  
By Kind of Cow and Progeny in 1977 Calf Crop

Kind of		Heifers					Steers				
Cow	Progeny	No.	ADG	Wt.	Gr.	Cond.	No.	ADG	Wt.	Gr.	Cond.
<u>Beaumont</u>											
XB	XB	26	1.59	701	13.1	8.1	31	1.14	677	13.3	7.2
SB	XB	8	1.43	626	12.9	7.7	8	1.24	588	11.6	7.2
SB	SB	9	1.21	515	12.3	7.9	10	0.92	510	11.7	7.1
<u>Bland</u>											
XB	XB	38	0.85	548	13.0	6.8	46	0.96	589	12.8	6.9
SB	XB	9	0.91	468	11.8	6.1	12	1.04	525	12.4	7.0
SB	SB	20	0.83	481	10.9	6.5	21	0.96	526	12.4	7.0
<u>Hanover</u>											
XB	XB	27	0.79	502	11.4	6.7	31	0.93	550	11.7	7.7
SB	XB	7	0.73	433	10.7	6.7	9	0.99	509	11.1	7.3
SB	SB	6	0.73	475	11.7	7.8	9	0.88	572	11.8	7.2
<u>Southampton</u>											
4W	4W	7	1.04	694	13.4	6.9	8	1.57	798	13.0	7.4
XB	XB	27	0.95	639	12.6	6.5	27	1.57	788	13.6	7.2
SB	XB	10	0.86	596	12.5	6.3	14	1.47	733	12.9	7.6
SB	SB	18	0.94	570	12.0	6.3	19	1.34	580	12.1	6.9
<u>State Farm</u>											
XB	XB	76	1.18	618	13.0	7.9	82	1.17	613	12.6	7.2
SB	XB	18	1.31	570	12.4	7.9	12	1.21	581	12.6	7.2
SB	SB	11	1.13	538	11.5	7.4	10	1.03	499	11.9	7.0
<u>All Locations Combined</u>											
XB	XB	194	1.08	599	12.7	7.3	217	1.14	630	12.7	7.2
SB	XB	52	1.09	547	12.2	7.1	55	1.21	597	12.3	7.3
SB	SB	64	0.96	520	11.6	6.9	69	1.06	541	12.1	7.0



Table 5  
Virginia Department of Corrections  
Phase II Cow Breed Evaluation: Postweaning Performance to 18 Months of Age  
by Sex and Kind of Cow - 1977 Calf Crop

Sire breed	Cow breed	Heifers					Steers				
		No.	ADG	Wt.	Gr.	Cond.	No.	ADG	Wt.	Gr.	Cond.
<u>Beaumont</u>											
SmA	CH	9	1.20	868	13.3	8.8	10	1.05	812	12.9	8.4
SmA	FH	8	1.19	869	13.0	7.9	7	1.16	953	13.3	8.9
SmA	ShH	9	1.09	805	13.1	8.7	15	1.15	863	13.1	9.2
SmA	HH	5	1.17	806	13.2	9.0	8	1.16	791	12.6	8.7
Her	HH	9	1.14	715	12.7	9.2	9	0.92	673	12.0	8.4
Combined		40	1.16	812	13.0	8.7	49	1.09	819	12.8	8.8
<u>Bland</u>											
Ang	AA	9	1.05	747	12.3	8.5	12	1.39	893	12.4	8.7
Her	HH	11	1.07	682	11.9	7.1	9	1.19	776	12.7	7.9
Ang	CH	12	1.18	835	13.1	8.2	18	1.50	959	13.1	9.0
Ang	CF	3	1.22	878	12.7	8.0	5	1.28	864	12.2	7.2
Ang	SH	17	1.08	770	13.0	8.2	16	1.44	927	13.4	8.4
Ang	HH	9	1.12	720	12.7	7.6	12	1.45	859	12.7	8.4
Sim	Sim %	5	1.21	800	13.4	7.6	6	1.30	866	13.5	7.2
Combined		66	1.11	765	12.7	7.9	78	1.41	892	12.9	8.3
<u>Hanover</u>											
A, SmH	AH	Heifers not weighed					10	0.82	685	12.9	7.0
A, SmH	BSH						4	0.87	714	12.5	6.7
A, SmH	CH						4	0.85	694	12.7	7.8
A, SmH	HH						6	0.83	706	12.7	7.0
Her	HH						6	0.76	667	12.8	6.8
Combined							30	0.84	685	12.8	7.0
<u>Southampton</u>											
Ang	AA	10	1.03	761	12.3	9.4	14	1.61	915	12.3	9.1
Char	Char	6	1.11	902	12.7	7.0	7	1.56	1085	14.0	8.1
A, SmH	CA	10	1.16	840	12.7	8.6	12	1.80	1119	13.8	9.4
A, SmH	FH	9	1.15	885	12.8	8.8	12	1.64	1134	13.7	9.2
SmH	AA	12	1.09	853	13.3	9.2	14	1.77	1108	13.1	10.5
A, 4W	4W	7	1.10	850	13.3	8.7	8	1.62	1106	12.6	9.0
Combined		54	1.10	844	12.8	8.7	67	1.68	1072	13.2	9.3
<u>State Farm</u>											
A, Sh	AH	10	1.14	786	12.7	10.1	18	1.08	782	11.8	8.5
A, Sh	BSH	13	1.08	786	12.8	8.7	7	1.03	786	12.8	8.1
A, Sh	CH	12	1.11	790	13.1	9.0	16	1.16	806	12.2	8.6
A, Sh	FH	20	1.14	839	13.2	8.8	19	1.09	823	12.3	8.5
A	ShH	8	1.09	784	12.8	9.1	16	1.18	858	12.8	9.2
A, Sh	SmH	11	1.14	830	13.1	10.1	14	1.20	851	13.4	8.8
A, Sh	HH	20	1.20	764	12.8	9.4	13	1.11	776	12.5	8.7
Her	HH	11	1.08	711	12.0	8.7	10	0.91	650	11.5	7.7
Combined		105	1.13	788	12.8	9.2	113	1.11	800	12.4	8.6

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Virginia

Location		Beaumont School for Boys, Beaumont, Va,			
Breed of sire		Sim x Ang	Sim x Ang	Sim x Ang	Hereford
Breed of dam		Char x Her	Hol x Her	Sh x Her	Hereford
Line or group <sup>1</sup>		4-Way x	4-Way x	4-Way x	3-Way x
Percent used in project		100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	27	27	29	26
	Yearling heifers	9	8	9	5
	Bulls and steers under 1 year	8	8	15	9
	Heifers under 1 year	9	15	12	7
	Bulls over 1 year	0	0	0	0
	Steers over 1 year	10	7	15	8
Repro. perf.	Percent pregnant <sup>2</sup>	74.1	88.9	96.5	76.9
	Calf survival percent <sup>3</sup>	85.0	91.7	93.1	80.0
Wean. perf.	Adj. ADG <sup>4</sup>	2.16	2.13	1.84	1.66
	Ave. type sc. <sup>5</sup>	13.7	13.7	13.0	12.9
Postweaning performance	No. of bulls	0	0	0	0
	No. of heifers	9	8	9	5
	No. of steers	10	7	15	8
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers	NO SLAUGHTER INFORMATION AT THIS LOCATION			
Remarks lbs calf/cow exp.		323	419	413	249
					275

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Virginia

Location		Bland Correctional Center, Bland, Va.			
Breed of sire		Angus	Angus	Angus	Angus
Breed of dam		Angus	Char x Her	Char x Hol	Sim x Her
Line or group <sup>1</sup>		Straightbred	3-Way x	3-Way x	3-Way x
Percent used in project		100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	33	42	12	43
	Yearling heifers	9	12	3	18
	Bulls and steers under 1 year	12	8	3	14
	Heifers under 1 year	11	16	4	10
	Bulls over 1 year	0	0	0	0
	Steers over 1 year	12	17	5	15
Repro. perf.	Percent pregnant <sup>2</sup>	75.7	61.9	58.3	69.8
	Calf survival percent <sup>3</sup>	92.0	92.3	100.0	80.0
Wean. perf.	Adj. ADG <sup>4</sup>	1.77	2.06	2.26	1.98
	Ave. type sc. <sup>5</sup>	11.8	13.5	13.0	13.0
Postweaning performance	No. of bulls	0	0	0	0
	No. of heifers	9	12	3	18
	No. of steers	12	18	5	16
Slaughtered	No. of bulls	0	0	0	0
	No. of heifers				
	No. of steers				
Remarks lbs calf/cow exp.		298	283	315	268
					237

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Virginia

Location		Bland Correctional Center (continued)			
Breed of sire		Hereford	Simmental		
Breed of dam		Hereford	% Sim		
Line or group <sup>1</sup>		Straightbred	Breeding up		
Percent used in project		100	100		
Inventory as of December 31, 1978	Cows 2 years and over	37	49		
	Yearling heifers	11	5		
	Bulls and steers under 1 year	12	17		
	Heifers under 1 year	5	13		
	Bulls over 1 year	0	6		
	Steers over 1 year	9	1		
Repro. perf.	Percent pregnant <sup>2</sup>	59.4	75.4		
	Calf survival percent <sup>3</sup>	77.3	81.1		
Wean. perf.	Adj. ADG <sup>4</sup>	1.49	1.95		
	Ave. type sc. <sup>5</sup>	11.9	13.4		
Postweaning performance	No. of bulls	0	7		
	No. of heifers	11	5		
	No. of steers	9	3		
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks lbs calf/cow exp.		172	299		

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Virginia

Location		Hanover Correctional Unit, Hanover, Va.			
Breed of sire		A, SmH	A, SmH	A, SmH	Hereford
Breed of dam		Ang x Her	BS x Her	Char x Her	Hereford
Line or group <sup>1</sup>		3 & 4-Way x	3 & 4-Way x	3 & 4-Way x	2 & 3-Way x
Percent used in project		100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	34	39	26	28
	Yearling heifers	6	14	8	7
	Bulls and steers under 1 year	9	13	7	6
	Heifers under 1 year	16	17	12	12
	Bulls over 1 year	0	0	0	0
	Steers over 1 year	17	5	9	9
Repro. perf.	Percent pregnant <sup>2</sup>	85.3	82.0	88.5	82.1
	Calf survival percent <sup>3</sup>	86.2	93.7	82.6	78.3
Wean. perf.	Adj. ADG <sup>4</sup>	1.46	1.38	1.46	1.37
	Ave. type sc. <sup>5</sup>	11.3	11.4	12.5	11.7
Postweaning performance	No. of bulls	0	0	0	0
	No. of heifers	5	14	8	7
	No. of steers	17	5	9	6
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers	NO ANIMAL SLAUGHTERED AT THIS LOCATION			
Remarks <sup>1</sup> lbs calf/cow exp.		270	276	278	224
					176

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Virginia

Location		James River-Powhatan Correctional Center, State Farm, Va.				
Breed of sire		Shorthorn	Ang, Sh	Ang, Sh	Ang, Sh	Angus
Breed of dam		Ang x Her	BS x Her	Char x Her	Hol x Her	Sh x Her
Line or group <sup>1</sup>		3-Way x	3-Way x	3-Way x	3-Way x	3-Way x
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	52	44	50	55	44
	Yearling heifers	11	13	13	20	8
	Bulls and steers under 1 year	25	23	21	28	16
	Heifers under 1 year	16	14	18	18	22
	Bulls over 1 year	0	0	0	0	0
	Steers over 1 year	18	4	16	19	10
Repro. perf.	Percent pregnant <sup>2</sup>	88.5	88.6	86.0	89.0	90.9
	Calf survival percent <sup>3</sup>	89.1	94.9	90.7	91.8	95.0
Wean. perf.	Adj. ADG <sup>4</sup>	1.92	2.07	1.96	2.03	1.82
	Ave. type sc. <sup>5</sup>	12.9	12.8	13.3	12.8	12.8
Postweaning performance	No. of bulls	0	0	0	0	0
	No. of heifers	11	13	13	20	8
	No. of steers	18	4	16	19	10
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers	NO SLAUGHTER INFORMATION FROM THIS LOCATION				
Remarks lbs calf/cow exp.		361	414	368	395	377

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory and Performance Data, S-10 Herds - 1978

State Virginia

Location		James River-Powhatan Correctional Center (cont.)			
Breed of sire		Ang, Sh	Ang, Sh	Hereford	4-Way
Breed of dam		Sim x Her	Hereford	Hereford	4-Way
Line or group <sup>1</sup>		3-Way x	Single x	Straightbred	Synthetic
Percent used in project		100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	50	59	54	21
	Yearling heifers	12	18	11	0
	Bulls and steers under 1 year	16	24	16	11
	Heifers under 1 year	22	24	28	7
	Bulls over 1 year	0	0	0	0
	Steers over 1 year	14	12	10	0
Repro. perf.	Percent pregnant <sup>2</sup>	86.0	86.4	88.9	95.2
	Calf survival percent <sup>3</sup>	88.4	94.1	91.7	90.0
Wean. perf.	Adj. ADG <sup>4</sup>	1.94	1.77	1.59	1.93
	Ave. type sc. <sup>5</sup>	13.0	12.8	11.8	12.7
Postweaning performance	No. of bulls	0	0	0	0
	No. of heifers	12	18	11	0
	No. of steers	14	12	10	0
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers	NO SLAUGHTER INFORMATION FROM THIS LOCATION			
Remarks lbs calf/cow exp.		350	352	315	391

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

<sup>5</sup>Suggest S-10 scoring system; indicate if different.

## Production, Inventory and Performance Data, S-10 Herds - 1978

State Virginia

Location		Southampton Correctional Center, Capron, Va.			
Breed of sire		Angus	Charolais	Sim x Her	Sim x Her
Breed of dam		Angus	Charolais	Angus	Char x Ang
Line or group <sup>1</sup>		Straightbred	Straightbred	3-Way x	4-Way x
Percent used in project		100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	28	28	26	29
	Yearling heifers	14	11	9	15
	Bulls and steers under 1 year	12	9	14	12
	Heifers under 1 year	14	10	10	17
	Bulls over 1 year	2	1	0	2
	Steers over 1 year	14	11	14	12
Repro. perf.	Percent pregnant <sup>2</sup>	96.4	85.7	96.2	100.0
	Calf survival percent <sup>3</sup>	100.0	79.2	92.0	100.0
Wean. perf.	Adj. ADG <sup>4</sup>	1.77	2.05	1.75	1.77
	Ave. type sc. <sup>5</sup>	12.5	13.7	13.0	13.3
Postweaning performance	No. of bulls	0	0	0	0
	No. of heifers	14	11	9	15
	No. of steers	14	11	14	12
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers	NO SLAUGHTER INFORMATION AT THIS LOCATION			
Remarks lbs. calf/cow exp.		419	342	391	448
					452

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments:<sup>5</sup>Suggest S-10 scoring system; indicate if different.



## Production, Inventory, and Performance Data, S-10 Herds - 1978

State Virginia

Location		Southampton Correctional Center, Capron, Va.			
Breed of sire		4-Way x			
Breed of dam		4-Way x			
Line or group <sup>1</sup>		Synthetic			
Percent used in project		100			
Inventory as of December 31, 1978	Cows 2 years and over	30			
	Yearling heifers	12			
	Bulls and steers under 1 year	13			
	Heifers under 1 year	13			
	Bulls over 1 year	2			
	Steers over 1 year	14			
Repro. perf.	Percent pregnant <sup>2</sup>	96.7			
	Calf survival percent <sup>3</sup>	89.7			
Wean. perf.	Adj. ADG <sup>4</sup>	1.98			
	Ave. type sc. <sup>5</sup>	13.0			
Postweaning performance	No. of bulls	0			
	No. of heifers	12			
	No. of steers	14			
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers	NO SLAUGHTER INFORMATION AT THIS LOCATION			

Remarks lbs calf/cow exp. 431

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments:

<sup>5</sup>Suggest S-10 scoring system; indicate if different.



Funds Expended on Beef Cattle Breeding Work in S-10 Herds  
During the Year Ending December 31, 1978

State Virginia

Source	Amount Spent for Permanent Non-recurring Items	Amount Spent for Operating Expenses
Regional Research Funds		\$ 43,036*
USDA funds from ARS		1,758
State-controlled funds <sup>1</sup>		59,588*

<sup>1</sup> Include all federal-grant funds, state appropriations, and receipts, if your station spends receipts, in addition to appropriated funds.

\* Salaries included

Income from the sale of cattle during the year 1978 (include total sales, whether spent on the project or not).

\$11,250

Regional Research Fund Allotment for year 1978

\$35,000



COLLEGE OF THE VIRGIN ISLANDS  
Agricultural Experiment Station  
St. Croix , U.S. Virgin Islands

I. PROJECT: VI00018 (S10)

General title: Breeding Methods for beef cattle in the Southern Region.  
Specific title: Breeding Methods for beef cattle in the U.S. Virgin Islands.

II. OBJECTIVES:

- A. To estimate genetic parameters associated with rate of growth and maturity and other characteristics of biological and economical importance.
  - 1. To compile and elucidate all information that exists on the Senepol breed.
  - 2. To characterize the Senepol breed by performance testing under Virgin Islands conditions and in other environments in the Southern Region.
  - 3. To determine the breeding value of the Senepol cattle for growth performance and maternal traits.
- B. To establish general combining ability of breeds, specific combining ability in breed crosses and heterosis of various types of crosses.
  - 1. To determine the breeding value of the purebred and crossbred Senepol for growth performance and maternal traits.

III. PERSONNEL:

H. D. Hupp, L. R. Smolenski

IV. ACCOMPLISHMENTS DURING THE YEAR:

A. Scope and Nature of Work

Background information on the history and development of the Senepol breed has been compiled and published. This was accomplished by reviewing old letters and documents, pertinent literature, and by personal communication with Senepol breeders.

This project derives its experimental animal units from cooperating Senepol breeders who are members of the Virgin Islands Senepol Association (VISA). Senepol breeders owning more than 5 head of Senepol cattle were contacted. Of the 15 breeders contacted, eight are participating in cooperative research, six are "interested" but not enrolled in the program and four are not interested (Table 1).



Animals in the program are permanently identified by either tattp or brand and are in an on-the-farm performance-testing program. At weaning, cows and calves are weighed. During the first year of research, only two the eight farms were able to match up calves with their dams. Thus, only these two farms possess adjusted weaning weights.

#### B. Research Results

Birth weights, on a limited sample, have averaged 65 pounds for both sexes. Adjusted 205 day weights averaged 475 pounds (215 kg). Mature bulls (2-12+ years) averaged 1466 pounds (665 kg) with an average length, from the withers to the first sacral vertebrae, of 35.1 inches (89.2 cm), height at the hip of 54 inches (137.2 cm), and length from hooks to pins of 19 inches (48.3 cm). Mature cows (2-12+ years) averaged 1075 pounds (488 kg), length 32.2 inches (81.8 cm), height 51.9 inches (131.83 cm), and length from hooks to pins of 1811 inches (46.0 cm).

#### V. FUTURE PLANS:

Present research work will continue to accomplish all listed objectives. Senepol carcass data collection will begin the first quarter of 1979. More extensive live animal measurements (i.e. birth weight, heart girth, cow efficiency) will be recorded. Various feedlot tests are under examination for possible future research.

#### VI. PUBLICATIONS:

Hupp, H. D. 1978. The continuing development of the Senepol Cattle. 8th Annual Agriculture and Food Fair of the Virgin Islands booklet.

Hupp, H. D. 1978. Senepol Cattle - History and Development. College of the Virgin Islands Agricultural Experiment Station Report #11.

Funds Expended on Beef Cattle Breeding Work in S-10 Herds  
During the Year Ending December 31, 1978State U. S. Virgin Islands

Source	Amount Spent for Permanent Non-recurring Items	Amount Spent for Operating Expenses
Regional Research Funds	\$48,778.71	
USDA funds from ARS		
State-controlled funds <sup>1</sup>		

<sup>1</sup>Include all federal-grant funds, state appropriations, and receipts, if your station spends receipts, in addition to appropriated funds.

Income from the sale of cattle during the year 19 (include total sales, whether spent on the project or not).

Regional Research Fund Allotment for year 1979 (FY)

\$45,000.00

Production, Inventory and Performance Data, S-10 Herds - 1978

State U.S. Virgin Islands

Cooperating Breeders		Annaly Farms Lawaetz	Castle Nugent Gasperi		Halver Moolenaar	Granard Est Nelthropp
Breed of sire		Senepol	Senepol	Senepol	Senepol	Senepol
Breed of dam		Senepol	Charolais	Senepol	Senepol	Senepol
Line or group <sup>1</sup>		Purebreds	Senepol- Charolais X	Purebreds	Purebreds	Purebreds
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1978	Cows 2 years and over	589	30	220	17	
	Yearling heifers	195	6	29	7	11
	Bulls and steers under 1 year	145	7	47	4	55
	Heifers under 1 year	143	4	62	5	44
	Bulls over 1 year	56	13	13	2	20
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent <sup>2</sup> pregnant					
	Calf survival percent <sup>3</sup>					
Wean. perf.	Adj. ADG <sup>4</sup>					
	Ave. type sc. <sup>5</sup>					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks	Total	1,128	60	371	35	405

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.

<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

<sup>4</sup>Indicate adjustments: Sex, Age of Dam

<sup>5</sup>Suggest S-10 scoring system; indicate if different.  
S-10-1 (Rev.)



## Production, Inventory and Performance Data, S-10 Herds - 1978

State U.S. Virgin Islands

Cooperating Breeders		Oscar E. Henry	Diamond Corp.	Joe Hodge	Albert McAuliff	
Breed of sire		Senepol	Senepol	Senepol	Senepol	
Breed of dam		Senepol	Senepol	Senepol	Senepol	
Line or group <sup>1</sup>		Purebreds	Purebreds	Purebreds	Purebreds	
Percent used in project		100	100	50	90	
Inventory as of December 31, 1978	Cows 2 years and over	12	133	8	4	
	Yearling heifers	3	3	2	2	
	Bulls and steers under 1 year	2	12	3	1	
	Heifers under 1 year	3	16	4	1	
	Bulls over 1 year	0	42	1	0	
	Steers over 1 year	4	0	0	0	
Repro. perf.	Percent <sup>2</sup> pregnant					
	Calf survival percent <sup>3</sup>					
Wean. perf.	Adj. ADG <sup>4</sup>					
	Ave. type sc. <sup>5</sup>					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks	Total	24	206	18	8	

<sup>1</sup>Purebreds, grade, line, sire number, crosses, treatment, etc.<sup>2</sup>Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.<sup>3</sup>Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.<sup>4</sup>Indicate adjustments: Sex, Age of Dam<sup>5</sup>Suggest S-10 scoring system; indicate if different.

Table 1

## SENEPOL CATTLE NUMBERS IN THE VIRGIN ISLANDS

Farm or Breeder	Cows	Bulls	Young Stock	Other	Total
Cooperating Breeders					
1 Annaly Farms	560	15	560	100 <sup>a</sup>	1235
2 Castle Nugent	260	13	220	60 <sup>b</sup>	553
3 Granard Estates	143	5	108	0	256
4 Diamond Corporation	110	2	94	0	206
5 Halver Moolenaar	22	1	20	15 <sup>c</sup>	58
6 Oscar Henry	20	0	12	0 <sup>d</sup>	32
7 Joseph Hodge	8	1	5	2 <sup>b</sup>	16
8 A. M. McAuliffe	3	0	4	2	9
	<u>1126</u>	<u>37</u>	<u>1023</u>	<u>179</u>	<u>2365</u>
"Interested" Breeders					
1 Charles Clark					≈250
2 Arthur Christensen	60	2	30	0	92
3 James Estates					40
4 Henry Isles					30
5 Jose Torrez	4	1	6	0	11
6 Ralph George	2	0	3	0	5
	<u>66</u>	<u>3</u>	<u>39</u>	<u>0</u>	<u>428</u>
"NOT Interested" Breeders					
1 Christian Hendricks					200
2 Ralph DeChabert	6			50	56
3 Two Farms on St. Thomas					
	<u>6</u>			<u>50</u>	<u>336</u>

<sup>a</sup>Native Dairy Creole crosses<sup>b</sup>Senepol-Charolais crosses<sup>c</sup>Holstein crosses<sup>d</sup>Senepol-Native crosses





